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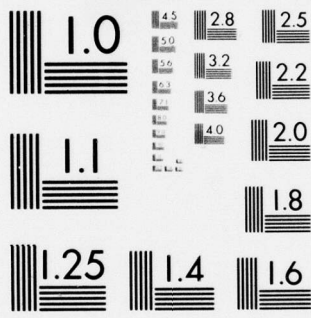
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THE STRUCTURE OF FOREIGN POLICY AND TRADE RELATIONSHIPS
WITHIN NORTH AFRICA

A Limited Empirical Test of the Cantori & Spiegel Model

by

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----- 9 Masters Thesis -----
Submitted in Partial Fulfillment of the

Requirements for the Degree of Master of Arts

in the Department of Government and International Studies ✓

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11 1978 12 197p.

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PURPOSE

For hundreds of years, historians, geographers, political philosophers and others have recognized what seemed to them to be cultural and geographic commonalities in the north western portion of Africa.¹ As a result of these observations, various collective names such as the Maghrib (or Maghreb), Afrique du Nord, North Africa, Barbary and Lands of the Atlas have been applied to what in more modern terms might be referred to as a regional subsystem.

A survey of recent literature clearly indicates that while most authorities seem to recognize the existence of some grouping variously called North Africa or the Maghrib, what modern states comprise that grouping or region is a widely debated question even to some extent among the governments of the states themselves. Some see a grouping of three states: Algeria, Morocco and Tunisia.² Others favor a four state system consisting of Algeria, Morocco, Tunisia and Libya.³ And still others see Algeria, Morocco, Tunisia and Libya as a subsystem, but one which is not north Africa-centric.⁴

surveys clearly show there is
Such a survey clearly illustrates the lack of agreement among North African authorities concerning

(cont. from p. iii)
the boundaries and structure of the region. Indeed, there is a lack of consensus today within the whole field of regional studies with regard to definitions as well as general characteristics and attributes of regional subsystems.⁵

In their book, The International Politics of Regions, Louis J. Cantori and Steven L. Spiegel employed a deductive and speculative research approach to identify fifteen regions which they believed existed in 1970, when their book was published. They identified North Africa as one of their postulated regions and presented a description of what they believed to be its boundaries and basic structure.⁶ It is the purpose of this paper⁽¹⁾ to conduct a partial empirical test of the⁽²⁾ North African regional model postulated by Cantori and Spiegel through an examination^{by examining} of foreign policy relationships and trade patterns and⁽²⁾ to compare the results with the Cantori and Spiegel model in terms of regional boundaries, subsystem structure and intra-systemic interactions.

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CHAPTER I

TEST FRAMEWORK AND LIMITATIONS

Oran R. Young, in his article, The Perils of Odysseus: On Constructing Theories of International Relations, has stated that "confusion and misconceptions about the state and nature of 'theory' have reached monumental proportions in the field of international relations."⁷ He goes on to make the point that there is no viable theory of international relations today and concludes that although the pursuit of theory development has a place in the field, there are ". . . a variety of useful activities that can be pursued without developing viable theories."⁸ While there are those who would probably disagree with Young's assessment of the current state of theory and the relative interdependence of theory and research, there seems little doubt that even given the possibility that attainment of a theory of international relations is an impossible dream, the knowledge which is gained along the road justifies an attempt.

Progressive scholars of international relations cite a deficiency in skillful and innovative level-of-

analysis selection within their field as one of the major obstacles to theory development.⁹ In order to understand the importance of level-of-analysis selection (the size of the unit one is going to observe at a given time), it is first necessary to understand models and how levels-of-analysis relate to them.

A model is a simplified picture of a part of the real world. It has some of the characteristics of the real world, but not all of them. It is a set of inter-related guesses about the world. Like all pictures, a model is simpler than the phenomena it is supposed to represent or explain.¹⁰

By this definition, both those who employ empirical techniques and those who follow the more traditional deductive and speculative approaches work with models since through words, numbers or other abstractions both must ultimately reduce the world to something less than reality while still presenting certain truths. The reality of one model with its own peculiar distortions may be useful for a certain specific purpose while another model with different inherent distortions may be equally useful for another purpose. Although models are useful, if not indispensable tools, they are by definition, imperfect things. It is therefore meaningless to criticize a model because it fails to present a complete picture of the real world. The worth of any given model is the degree to which it can accurately describe and explain the relationships among the phenomena under investigation and offer promise

of reliable prediction.¹¹

In international relations as with any other phenomenon, a single model can portray only some of the character of reality. It is useful, therefore, to have many models, each representing some specific attribute of the phenomena under investigation.¹² In such fields as comparative political studies, scholars have long been blessed with a wide range of models, including the group approach, structural-functional analysis, and the elite and political culture approaches.¹³ In the field of international studies, however, until fairly recently, the models available for analytical use were very limited. One could choose between the unit-actor approach which focused on individual states, and the global approach which lumped all states together into a model variously referred to as the "world community," the "family of nations," or the "international society." These early global approaches were considerably lacking in scientific rigor and when the concepts which they suggested (community, family and society) were applied to real world cases, they offered the analyst little more than weak, analogical models with which to attempt to conceptualize the complex organization of international relations. In their search for a broader, more precise range of analytical tools, scholars in the field of international relations have begun to turn in ever growing numbers to

systems theory as the basis for models which can be used at several different levels of investigation.¹⁴ In contrast to the loose, analogical nature of earlier global approaches, the designation of the world as a system reflects:

. . . an explicit attempt to adopt a precise concept which has proved valuable to other social sciences and to the physical sciences as well. Furthermore, it is a neutral concept. Whereas the terms "family," "society," and "community" all suggest the existence of a basic unity and coherence, the notion of a system does not quite as readily imply characteristics which may mislead the observer. More important, a "systems perspective" facilitates a clearer formulation of the main variables with which students of international politics and foreign policy must contend.¹⁵

In spite of the wide acceptance of the system concept by the international relations community, its adaptation from the natural sciences into the framework of the social sciences has not taken place without some confusion. As Kay Boals has noted: "Despite--or perhaps because of--the frequent use of the concept 'system' in political science, there exists great confusion concerning its definition and conceptual implications."¹⁶ Certainly a quick review of books and articles critiquing the systems model or making use of it, will clearly point out the diversity of definitions which are currently in use.¹⁷ Conceptual implications are equally troublesome; is an international relations system

. . . a fact, a goal or a tool of analysis?
 Is it to be discovered, created, or invented?
 Does it have objective existence independent
 of volition, is it a quality to be attained,
 or is it a way of ordering and interpreting
 observable qualities and quantities?¹⁸

These points of definition and concept implication are important issues for the international relations community, but they are questions which, to date, have not yet been resolved. The resolution of the systems dispute is beyond the scope of this paper, and yet our very purpose here is to test a model based on the systems concept. In addition, many of the analytic techniques which we use to conduct that test flow directly from the systems concept. Consequently, we have had to select for our use a definition of system which, while meeting standards we believe to be exacting and appropriate to international relations, would almost certainly be challenged by some in the field.¹⁹ In her critique of systems theory adaptation to the field of international relations, Kay Boals argues that

. . . it seems advisable to include within the concept "system" both elements (actors) and linkages (patterns of interaction), thereby distinguishing more meaningfully between a system and its environment. The term "structure" could then be used to refer to the discernible ordered pattern of relationships among elements of the system. . . .²⁰

Cantori and Spiegel, in their book The International Politics of Regions, use the following definition which while

simple, seems to meet these criteria: "Any system is a structure that is perceived by its observers to have elements in interaction or relationships and some identifiable boundaries that separate it from its environment."²¹ We will also use that definition in this paper.

As mentioned previously, an especially attractive aspect of the systems approach is that it lends itself to application at many different levels-of-analysis. In the field of international relations, an extremely important attribute is the relationship of parts to the whole. Since people tend to form units which we call families, nations, transnational organizations, regions, etc., it is possible to observe and portray many different aspects of international relations reality depending upon the level-of-analysis (type of unit) selected at a given time. Thus, we may construct a nation model, a regional model, and so on, each based on a different level-of-analysis and each capable of portraying different aspects of reality.

In the spectrum ranging from the individual person at one extreme to the total international system at the other, most international relations scholars today ". . . have tended to settle upon the nation as . . . [their] most comfortable resting place."²² Certainly the nation as a level-of-analysis has its merits, but it should not be used to the exclusion of all other levels. It should be

borne in mind that ". . . there is no need to make a once-and-for-all decision concerning research foci,"²³ and that in some cases the region can be a worthy level-of-analysis. In that regard it has been pointed out that

. . . the domestic politics of a nation cannot be fully understood without reference to the neighbouring environment in which that nation has developed, and that international politics cannot be fully comprehended if there is concentration only on the relations among the greatest powers.²⁴

In order to bridge that gap, the regional subsystem is useful as an ". . . intermediate unit of analysis between the nation-state on the one hand and the dominant system on the other."²⁵ Then too, the regional subsystem approach ". . . presents an opportunity for the integration of the findings of area specialists and international relations students."²⁶ Finally, it is important to gain further insight into those forms of behavior which seem to hold true for all regions and those which are peculiar to specific regions or types of regions.²⁷

As previously noted, scholars in the field of regional studies have been unable to agree on the characteristics and attributes of regional subsystems in general and on the makeup of specific regional groupings in particular. While recognizing that this lack of consensus exists, Cantori and Spiegel, in their book The International Politics of Regions, identified fifteen regions which they believed existed at the time their book was

published in 1970. They offer their listing ". . . not as a final formulation, but rather as a suggestion and perhaps provocative postulation."²⁸ In constructing their model, Cantori and Spiegel used a traditional deductive and speculative research approach which they described as the ". . . systematic comparisons of dynamic political realities."²⁹

They began by developing seven supporting generalizations about subordinate systems.³⁰ From these generalizations they

. . . concluded that a subordinate system consists of one state, or of two or more proximate and interacting states which have some common ethnic, linguistic, cultural, social, and historical bonds, and whose sense of identity is sometimes increased by the actions and attitudes of state external to the system.³¹

Based on their seven basic generalizations and the conclusions which they drew from them, Cantori and Spiegel identify North Africa as one of fifteen contemporary regions.³²

Within each region they further define a core sector consisting ". . . of a state or group of states which form a central focus of the international politics within a given region."³³ In the case of North Africa, they identify the core states as Algeria, Morocco and Tunisia.³⁴ Beyond the core, each region has a peripheral sector including

. . . all those states within a given subordinate system which are alienated from the core sector in some degree by social, political, economic, or organizational factors, but which nevertheless play a role in the politics of the subordinate system.³⁵

Here, Mauritania, Libya and Spanish Sahara (now Western Sahara) are identified as members of the peripheral sector of North Africa.³⁶ Finally, each region has an intrusive system consisting ". . . of the politically significant participation of external powers in the international relations of the subordinate system."³⁷ France, the U.S.S.R., the U.S., the P.R.C. and Spain are identified as members of the intrusive system of North Africa.³⁸ Cantori and Spiegel see the membership of the regions not as static, but rather undergoing changes ". . . especially on their peripheries as political circumstances change with time."³⁹

By having constructed a model with a deductive and speculative research approach and having openly admitted to the fluid nature of regional membership, Cantori and Spiegel invite frequent empirical testing of their model. This is not to infer ". . . that empirical observation--subject as it is to a host of errors--is any better a basis of explanation than informed deduction, inference, or analogy."⁴⁰ It is a simple recognition of the fact that the empirical approach offers us another useful, but imperfect model with a different perspective on the reality of international relations. In other words, it is

another valuable tool which should not be overlooked.

Cantori and Spiegel's Subordinate System Model suggests an almost infinite number of other models which could be constructed and operationalized in order to take into account historical, cultural, political, and other significant aspects of interaction. While exhaustive empirical testing of the model over a wide range of variables is a noble aim, it is beyond the scope of this paper. In keeping with practical restraints of time and space it has been necessary to place a number of limitations on this study. To begin with, although Cantori and Spiegel identify states which they believe comprise a system that intrudes upon the postulated North African region, the scope of this paper will be limited to a partial analysis of the postulated core and peripheral states only. And while Cantori and Spiegel included Spanish Sahara (which was still a colony of Spain at the time their book was published) as one of the postulated peripheral states, its status changed in the latter period covered by this study and for that reason it is not treated here as a separate political entity.⁴¹

In a paper of this scope it is also necessary to limit the number of regional subsystem attributes investigated. Table 1 presents a listing of some attributes which have been suggested by prominent analysts in the field of regional studies as useful in identifying

TABLE 1

REGIONAL SUBSYSTEM ATTRIBUTE LIST

<u>Attribute Number</u>	<u>Description</u>
1.	Proximity or primary stress on a geographic region.
2.	Actors' pattern of relations or interactions exhibit a particular degree of regularity and intensity.
3.	Intrarelatedness--a condition wherein a change at one point in the system affects other points.
4.	Internal recognition as distinctive area.
5.	External recognition as distinctive area.
6.	One or more actors.
7.	At least two actors.
8.	At least three actors.
9.	Small powers only.
10.	Units of power are relatively inferior to units in the dominant system.
11.	Subordination in the sense that a change in the dominant system will have a greater effect on the subsystem than the reverse and there is more intensive and influential penetration of the subsystem by the dominant system than the reverse.
12.	Geographical-historical zone.
13.	Some degree of shared ethnic, linguistic, cultural, social and historical bonds.
14.	A relatively integration and united area.

TABLE 1 -- CONTINUED
REGIONAL SUBSYSTEM ATTRIBUTE LIST

<u>Attribute Number</u>	<u>Description</u>
15.	Some evidence of integration or a professed policy of achieving further economic, political and social integration.
16.	Functionally diffuse.
17.	Explicit institutional relations or subsystem organization.
18.	Autonomy-intrasystem actions and responses predominate over external influences.
19.	A distinctive configuration of military forces.
20.	A regional equilibrium of local forces.
21.	Common developmental status.

SOURCE: William R. Thompson, "The Regional Subsystem: A Conceptual Explication and a Propositional Inventory," International Studies Quarterly 17, 1 (March 1973): 93, table 2.

regional subsystems. Table 2 presents an analyst-attribute match. Of the 21 attributes listed, numbers 1 and 2 were most consistently cited by the 18 analysts. Of these two, attribute 1 (proximity or primary stress on a geographic region) is obviously implicit in the geographic location of states selected by Cantori and Spiegel in their postulated North African region and thus does not lend itself to further investigation. Attribute 2 (actors' pattern of relations or interactions exhibit a particular degree of regularity and intensity) seems to offer promise of providing a vehicle for identifying regional boundaries, subsystem structure and intra-systemic interactions. Indeed, Cantori and Spiegel have postulated that patterns of foreign policy and trade interactions are two important indicators of how states fit into their mosaic of regions, cores and peripheries.⁴² Having thus limited the regional subsystem attributes to be investigated in this exercise to patterns of foreign policy and trade interaction, the next step is the selection of appropriate models which will provide a means of empirically testing the Cantori and Spiegel model.

J. Barron Boyd, Jr., in his paper, "The Structure of Foreign Policy Relationships Within the Southern African Subsystem," has developed an empirical model that uses foreign policy events as input data and which, when applied to a small group of states, presents a pattern of

TABLE 2

ANALYST-ATTRIBUTE MATCH

Analysts	Attribute Numbers																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Binder (1958)	N	O	T			E	X	P	L	I	C	I	T								
Hodgkin (1961)	N	O	T			E	X	P	L	I	C	I	T								
Modelski (1961)	X	X						X	X						X						
Aron (1962)	X	X		X	X							X					X			X	
Brecher (1963)	X			X	X			X		X	X								X		
Hoffman (1963)				X	X							X									
Schwartzman (1966)					X								X				X				X
Reinton (1967)	X	X													X		X				
Zartman (1967)	X		X								X						X				
Kaiser (1968)	X	X		X													X	X			
Young (1968)	N	O	T			E	X	P	L	I	C	I	T								
Bowman (1968)	X			X	X			X			X			X							
Hellmann (1969)	X	X		X													X				
Sigler (1969)	X												X								
Cantori & Spiegel (1969)	X	X			X	X							X								
Haas (1970)	X	X					X														
Thompson (1970)	X	X		X				X	X		X										
Yalem (1970)	N	O	T			E	X	P	L	I	C	I	T								
Miller (1970)	X	X			X	X															
Sheperd (1970)		X						X							X						
Dominguez (1971)		X	X																		

SOURCE: William R. Thompson, "The Regional Subsystem: A Conceptual Explication and a Propositional Inventory," International Studies Quarterly 17, 1 (March 1973): 94, table 3

the foreign policy relationships existing within that group of states.⁴³ By applying Boyd's model to the states surveyed in this study and examining both aggregate period and time-series patterns which emerge, we will be able to draw limited conclusions concerning the boundaries of the region, subsystem structure and intra-systemic interactions in terms of foreign policy event interactions.

In the case of trade interactions, the second regional subsystem attribute to be investigated in this exercise, we have a factor which lends itself to a less complex model than that required to deal with foreign policy events. Here, we will simply draw upon export and import trade figures among the states of the survey group and apply graphic techniques to develop patterns of trade relations within that group of states. By analyzing the results of this systematic survey of intra-group trade, both in an aggregate time period mode and in a time-series mode, we will be able to draw limited conclusions concerning the boundaries of the region, subsystem structure and intra-systemic interactions in terms of trade interaction.

Following a discussion of the major limitations inherent in the Boyd model and the trade analysis approach used in this study, these techniques will be applied to the five states of Morocco, Tunisia, Algeria, Mauritania and Libya which make up the core and periphery of a North African region postulated by Cantori and Spiegel.⁴⁴ In

addition to these five states, two others (Egypt and Italy) have been added to the survey group as investigation controls to provide a means of verifying our findings. Since Egypt and Italy are not members of the postulated core, periphery nor intrusive states in the North African region postulated by Cantori and Spiegel, the extent to which they fit into the emerging patterns of foreign policy and trade interaction, or fail to, should provide some check on the techniques which we are applying to our investigation. Furthermore, they should provide an indication of how distinctly the boundaries of the postulated region can be defined, at least in terms of the two attributes we have selected for this investigation. Foreign policy events flowing among the seven states of this survey group during the years 1973-1975 will be taken from the Africa Research Bulletin.⁴⁵ Export-import figures among the states of the survey group during the years 1967-1975 will be taken from documents published by the International Monetary Fund, the Organization For Economic Co-operation and Development, and the United Nations Economic Commission For Africa.⁴⁶ From the empirical analysis of the foreign policy and trade interactions suggested by the data applied to the Boyd model and the export-import survey, conclusions concerning the relationships of the surveyed states will be drawn and comparisons will be made between foreign policy and trade patterns as

well as with the structure suggested by Cantori and Spiegel.

Before beginning the application of the two analytic techniques employed in this study, it is important at this point to examine the major limitations inherent in them. The Boyd technique is another model. More precisely it is a model made up of a number of submodels, several of which have been developed by others. It is not a perfect thing and therefore what comes out of it will not be an explanation of total reality.

One of the major weaknesses of Boyd's model involves the problem of defining and operationalizing foreign policy behavior. Since the purpose of the model is to demonstrate to what extent there is a foreign policy relationship among a small group of states, these are key issues. For the purpose of his model, Boyd quotes Charles W. Kegley, who has defined

. . . foreign policy as a series of events which can be conceptualized as "the acts initiated by national governments on behalf of their societies, and pursued beyond their national boundaries, to affect changes in the behavior of other nation-states and international actors in the international system."⁴⁷

In operationalizing this definition, Boyd draws the event data representing the acts from public sources such as newspapers, journals and indexes. (We will do the same.) While such event data has the advantage of being readily

available, it imposes two limitations upon our model.

First, coming as it does from public sources, event data overemphasizes ". . . the non-routine, newsworthy, out of the ordinary, foreign policy happenings. . ."⁴⁸ Second, for this same reason, event data tends to ignore ". . . the routinized, ongoing transactions or the long-term relationships which form the bulk of international relations."⁴⁹

While more difficult to obtain, quantify, qualify and process than event data, partly because of the sheer volume of data which would be involved, it should be possible, especially with the aid of computers, to collect and introduce routine international transaction data into a similar model and, by so doing, gain a more complete assessment of transaction relationships within the selected group of states. Because of the limited scope of this paper, no attempt will be made here to introduce routine international transaction data into our analysis.

Another limitation of the Boyd model, growing out of its focus on foreign policy event data, is the conversion process which must take place between the time event data articles are collected and those articles are metricized for further processing by means of formuli, graphs and other techniques which can be operationalized only with numbers. As previously mentioned, the Boyd model relies upon a number of submodels and in the case of article metricization, Boyd employs a technique developed by

Herbert L. Calhoun.⁵⁰ In essence, the Calhoun procedure is as follows: The basic concept of each event data article is reduced to one of twenty eight single word descriptives ranging from "Cooperate" at the extreme positive end of the spectrum to "Force" at the extreme negative end. Since a numerical value is associated with each single word descriptive, the event articles are reduced by this procedure to quantities which are intended to represent the content of intra-systemic interaction. Although Boyd presents a strong case in defense of the Calhoun procedure, there are two limitations inherent in its use which must not be ignored. The first of these limitations is the unproven reliability and validity of the Calhoun procedure as an instrument of measure. That is to say, is it accurate and does it measure what we really wish to measure.⁵¹ Although, as Boyd points out, the Calhoun procedure has been devised in accordance with rigorous criteria for the construction and validation of scales, its validity and accuracy can only be proven over time. Perhaps this paper will, in part, contribute to that validation process. The second limitation involving the Calhoun procedure has to do not with its design characteristics but with the manner in which it is applied to the event data articles. When the analyst is faced with the requirement imposed upon him by the technique of reducing articles to single word descriptives, he is confronted with a value judgment situation.

For this reason it is possible that with any given article, two different analysts might assign different single word descriptives to the same article. It is thus desirable to have all articles coded by several trained analysts and to use an average of their descriptive value assignments as a means of reducing the distortion which could grow out of the value judgment of a single analyst. Again, because of practical limitations on this paper, the ideal has not been possible to achieve and all articles have been coded by a single analyst.

One criticism of studies such as this is that they lack historical depth.⁵² In the case of the Boyd model, any relationship which it seems to indicate will be valid only for the time period determined by the event which is used. The foreign policy relationships of states are fragile and fluid things. Therefore, a particular pattern which emerges when we select data, say for the period 1973-1975 may no longer exist if we were to use the same technique on the same states with data covering the period 1975-1977. Although some of the graphic techniques involved in the Boyd model lend themselves to processing by only the most sophisticated computers, with the aid of such machines it might be possible to gain more historical depth by applying the model to a greater period of years. In its manual application, however, the model becomes over-cumbersome when it is applied to periods in excess of

three or four years. Because this study is dependent upon manual data reduction, foreign policy events for a three year period only have been analyzed.

As noted earlier, the Boyd model is made up of a number of submodels. It is heavily dependent upon the adaptation to the field of international relations of techniques and analytic methods originally developed for use in such diverse disciplines as psychology, sociology and certain branches of mathematics. From psychology, the Boyd model draws heavily upon small group interaction models. Psychologists have observed in small groups of people over time a correlation between the influence that certain members of the group have with other group members and intra-group asymmetric communications flow; those group members who receive more communications than they send also tend to have more influence over group members than others who have a balanced flow or send more than they receive.⁵³ There certainly appears to be a strong analogy between the communications flow within a small group of people and foreign policy statement flow within a small group of states, particularly if we go one step further and consider states as unitary actors. But the question remains, is the analogy perfect or at least close enough to insure reliable and valid results when we apply this psychological tool to international relations. While Boyd's model is not the only one in the field which has borrowed this device from

psychology, it must still be considered a limitation until it has been proven through use in the field. Steven Brams, who has applied this technique to the study of influence relationship structures in the international system, further cautions that it is dangerous to attempt to draw conclusions about the influence or lack of influence of particular nations when an asymmetrical relationship occurs for a time period of short duration only.⁵⁴ In the case of sociology, the Boyd model draws upon network analysis techniques which were originally developed to chart patterns of contact among members of a social group.⁵⁵ And in the case of mathematics, the Boyd model makes use of graph theory techniques and theorems.⁵⁶ Here again, as was the case of borrowings from psychology, the analogies between these models and the international relations situations to which we are attempting an adaptation seem strong, but the use of these techniques must be considered possible limitations until they have been proven valid and reliable through use in this field.

Finally, the Boyd model is totally unequipped to deal with the aspect of intent. In fact, although Boyd does not specifically say so, his model appears to have been consciously constructed so as not to address this very critical but also very illusive aspect of foreign policy behavior. Foreign policy flows from decisions and, as Michael Brecher has pointed out, "contrary to conventional wisdom

or myth, /decisions are/ made by identifiable persons authorized by a state's political system to act within a prescribed sphere of external behavior."⁵⁷ Therefore, to get at intent, one must be able to enter the heads of those individuals making the decisions. This is an ambition which while worthy of effort, has thus far proven difficult, if not impossible to achieve.⁵⁸ Some have made the attempt through the use of psychoanalytic techniques, some have tried by conducting interviews with the decision makers and others have attempted to get at the problem through content analysis of speeches and correspondence. Yet the fact remains that "a leader's personal values, motives and dispositions shape his perception of the situations which confront him and his definition and evaluation of the choices of action open to him,"⁵⁹ and these have thus far proven difficult if not impossible to measure. While the efforts of international relations students to measure intent have certainly added something to the reality of the models to which they have been applied, the returns have been very meager for the effort expended. John F. Kennedy expressed the problem of getting at intent very clearly in the following epigraph:

The essence of ultimate decision remains impenetrable to the observer--often, indeed, to the decider himself. . . there will always be the dark and tangled stretches in the decision-making process--mysterious even to those who may be most intimately involved.⁶⁰

The trade interaction model operationalized in this paper attempts to adapt from other disciplines several of the same techniques borrowed by its sister foreign policy relationship model. Specifically, the trade interaction model also relies upon network analysis techniques from the field of sociology as well as graph theory techniques and theorems from mathematics. The limitations inherent in the application of these transplanted techniques to foreign policy relationship analysis would seem to apply equally in the trade interaction model. In addition to these common limitations shared by the two major models of this study, the trade interaction model has some additional limitations which should be mentioned as well.

Although in the trade interaction model we are not faced with the problem of having to metricize verbal data, we encounter, nonetheless, a data accuracy problem. All analysis techniques employed in the trade interaction model are based entirely upon data drawn from export and import figures of the surveyed group members for a period of nine years (1967-1975). These figures were drawn from the most reliable sources available and, where possible, figures were cross-checked in more than one source to insure accuracy.⁶¹ In spite of these efforts, it is clear that some of the data is not absolutely accurate. For example, if a substantial export figure is reported from State A to State B for a given year but State B has no import figure

reported from State A for that same year, it is obvious that either the export figure is incorrect or that the import report is incomplete. In like manner, if State A shows an export to State B for a given year valued at \$1000 and State B reports an import from State A valued at only \$800 in the same year, again it is clear that either the export figure from State A is incorrect or State B's figure is incorrect or incomplete. In other cases, where no export or import trade is shown between two states for a year, it is often impossible to know whether or not no trade took place or trade took place but was not reported. Faced with this situation, we developed a systematic set of rules designed to overcome the problem through approximation, but it is evident that this data problem places a limitation on the model.⁶² One of the approximations used was a + or - 10% factor applied to reported exports and reported imports in order to derive unreported figures from the sending or receiving states. While the +10% figure was probably the best available method for deriving unreported imports from reported exports, a -9.1% figure may have provided a better means of converting imports to exports.⁶³

We have enumerated a large number of limitations and possible weaknesses in the Boyd model and the trade pattern model. This does not mean that the models are without use and are not to be trusted. These limitations are real,

however, and must be borne in mind so that we do not attempt to overextend the meaning that may be drawn from the application of the models to particular cases.

The greatest strengths of these models is that they give us ready means of defining the boundaries of a suspected political subsystem in terms of the gross international political and trade activities taking place among the members of the group of states under investigation. The Boyd model is able to take into account both the quantitative and scaled qualitative aspects of foreign policy events. And finally, by employing an aggregate, cross-sectional analytic approach and a time-series mode, both models not only enable the analyst to consider the existence of a structural relationship at a fixed period in time, but give him a means of determining to what extent the relationships are constant over a given period of time.

The technical framework of the models, which are largely amalgamations of formuli and graphic techniques and a systematic analysis of their results, will become apparent as they are applied to the states of our suspected North African subsystem. For a detailed account of the development of the Boyd model and for an example of its application to a Southern African setting for the years, 1970-1972, the reader is directed to Boyd's paper, "The Structure of Foreign Policy Relationships Within the Southern African Subsystem."

CHAPTER II

FOREIGN POLICY RELATIONSHIPS

AGGREGATE ANALYSIS

We have taken as our survey group the states of Algeria, Morocco, Tunisia, Libya and Mauritania, which make up the core and periphery of a North African region postulated by Cantori and Spiegel; in addition, we have added Egypt and Italy (two states not included in the Cantori and Spiegel North African model) as scientific controls. The first step of our empirical analysis was to identify all of the possible interactions which could occur within the group and, for ease of identification, to assign a Dyad Number to each combination. These possible interactions are listed in Chart I.

Next, news input events were extracted from the Africa Research Bulletin for the years 1973-1975 and Calhoun's scale values (Chart II) were assigned to each event.⁶⁴ All events contained in the Bulletin for the three year target period which involved reciprocal and nonreciprocal interactions within the seven state group were included and have been broken down by year and by actor (initiator of the event). These are displayed in Charts III-V.

CHART I

DYADS OF THE SURVEY GROUP
(Postulated Region of North Africa and Two Control States)

<u>Actor</u>	<u>Target</u>	<u>Dyad Number</u>
Algeria	Morocco	01
Algeria	Tunisia	02
Algeria	Libya	03
Algeria	Mauritania	04
Algeria	Egypt*	05
Algeria	Italy*	06
Morocco	Algeria	07
Morocco	Tunisia	08
Morocco	Libya	09
Morocco	Mauritania	10
Morocco	Egypt*	11
Morocco	Italy*	12
Tunisia	Algeria	13
Tunisia	Morocco	14
Tunisia	Libya	15
Tunisia	Mauritania	16
Tunisia	Egypt*	17
Tunisia	Italy*	18
Libya	Algeria	19
Libya	Morocco	20
Libya	Tunisia	21
Libya	Mauritania	22

CHART I -- CONTINUED

DYADS OF THE SURVEY GROUP
(Postulated Region of North Africa and Two Control States)

<u>Actor</u>	<u>Target</u>	<u>Dyad Number</u>
Libya	Egypt*	23
Libya	Italy*	24
Mauritania	Algeria	25
Mauritania	Morocco	26
Mauritania	Tunisia	27
Mauritania	Libya	28
Mauritania	Egypt*	29
Mauritania	Italy*	30
Egypt*	Algeria	31
Egypt*	Morocco	32
Egypt*	Tunisia	33
Egypt*	Libya	34
Egypt*	Mauritania	35
Egypt*	Italy*	36
Italy*	Algeria	37
Italy*	Morocco	38
Italy*	Tunisia	39
Italy*	Libya	40
Italy*	Mauritania	41
Italy*	Egypt*	42

*Non-members of the postulated region of North Africa

CHART II
CALHOUN'S SCALE VALUES

<u>Rank</u>	<u>Concept</u>	<u>Value</u>
1	Cooperate	4.674
2	Bargain	3.531
3	Reward	3.387
4	Negotiate	3.058
5	Consult	2.942
6	Agree	2.780
7	Propose	2.568
8	Grant	2.518
9	Approve	2.514
10	Participate	2.459
11	Request	1.241
12	Promise	1.018
13	Yield	0.720
14	Comment	0.108
15	ORIGIN	0.000
16	Reduce	-1.070
17	Warn	-1.668
18	Demonstrate	-1.807
19	Deny	-1.866
20	Protest	-1.982
21	Accuse	-2.653
22	Reject	-2.884
23	Expel	-3.062
24	Demand	-3.181
25	Threat	-3.342
26	Conflict	-3.441
27	Seize	-3.503
28	Force	-4.004

CHART III
FOREIGN POLICY
INTERACTION EVENTS
1973

Algeria - Actor

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
01(Morocco)	LM-17/3/73	2793B	Deny	-1.866
	NA-10/5/73	2869B	Approve	2.514
02(Tunisia)	R. Algiers-10/7/73	2935A	Cooperate	4.674
	LM-1/12/73	3072B	Agree	2.780
	NA-24/9/73	2981C	Agree	2.780
03(Libya)	LM-20/2/73	2749C	Agree	2.780
	R. Algiers-29/3/73	2780B	Agree	2.780
04(Mauritania)	NA-13/2/73	2750A	Agree	2.780
	NA-10/5/73	2869B	Approve	2.514
05(Egypt)*				
06(Italy)*				

Morocco - Actor

07(Algeria)	ARB-24/11/73	3046B	Comment	0.108
	LM-17/3/73	2793B	Accuse	-2.653
	R. Rabat-10/5/73	2869B	Request	1.241
08(Tunisia)	LEM-13/1/73	2717A	Agree	2.780
	NA-24/9/73	2981C	Reject	-2.884
09(Libya)	LM-11/3/73	2793AB	Accuse	-2.653
	LM-13/2/73	2750C	Accuse	-2.653
	UNFP-6/73	2888A	Accuse	-2.653
	LEM-23/2/73	2768A	Comment	0.108
10(Mauritania)	R. Rabat-10/5/73	2869B	Request	1.241
11(Egypt)*				
12(Italy)*				

Tunisia - Actor

13(Algeria)	ARB-24/11/73	3046B	Comment	0.108
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CHART III -- CONTINUED
FOREIGN POLICY
INTERACTION EVENTS
1973

Tunisia - Actor (Continued)

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
14(Morocco)	LEM-13/1/73	2717A	Agree	2.780
	NA-24/9/73	2981C	Reject	-2.884
15(Libya)	R. Tripoli-5/2/73	2753B	Comment	0.108
	Act-22/2/73	2768A	Comment	0.108
16(Mauritania)	Act-11/1/73	2718B	Comment	0.108
	LM-31/12/73	3072B	Agree	2.780
17(Egypt)*				
18(Italy)*				

Libya - Actor

19(Algeria)	LM-20/2/73	2749C	Agree	2.780
	R. Algiers-29/3/73	2780B	Agree	2.780
20(Morocco)	LM-13/2/73	2750C	Accuse	-2.653
	LM-26/6/73	2888A	Reject	-2.884
21(Tunisia)	R. Tripoli-5/2/73	2753B	Comment	0.108
22(Mauritania)	MAC-25/1/73	2716B	Approve	2.514
	NA-13/9/73	2983B	Agree	2.780
23(Egypt)*	R. Libya-15/4/73	2819A	Cooperate	4.674
	NA-23/7/73	2911C	Cooperate	4.674
	TT-30/8/73	2948C	Bargain	3.531
	NA-15/11/73	3060A	Accuse	-2.653
	NA-29/12/73	3071A	Expel	-3.062
	TT-29/12/73	3087C	Threat	-3.342
24(Italy)*				

Mauritania - Actor

25(Algeria)	NA-13/2/73	2750A	Agree	2.780
	NA-10/5/73	2869B	Approve	2.514
26(Morocco)	NA-10/5/73	2869	Approve	2.514

CHART III -- CONTINUED

FOREIGN POLICY
INTERACTION EVENTS
1973Mauritania - Actor (Continued)

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
27(Tunisia)	IM-31/12/73	3072B	Agree	2.780
28(Libya)	MAC-25/1/73	2716B	Consult	2.942
	NA-13/9/73	2983B	Agree	2.780
29(Egypt)*				
30(Italy)*				

Egypt* - Actor

31(Algeria)				
32(Morocco)				
33(Tunisia)				
34(Libya)	EGG-11/1/73	2715C	Cooperate	4.674
	R. Cairo-20/6/73	2879B	Cooperate	4.674
	R. Cairo-28/6/73	2879C	Cooperate	4.674
	NA-23/7/73	2912A	Cooperate	4.674
	TT-30/8/73	2948A	Bargain	3.531
35(Mauritania)				
36(Italy)*				

Italy* - Actor

37(Algeria)
38(Morocco)
39(Tunisia)
40(Libya)
41(Mauritania)
42(Egypt)*

CHART IV
FOREIGN POLICY
INTERACTION EVENTS
1974

Algeria - Actor

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
01(Morocco)				
02(Tunisia)	Act-24/3/74	3159C	Cooperate	4.674
	LEM-15/1/74	3100C	Comment	0.108
03(Libya)	LEM-15/1/74	3100C	Comment	0.108
04(Mauritania)	NA-22/8/74	3349A	Agree	2.780
05(Egypt)*				
06(Italy)*				

Morocco - Actor

07(Algeria)				
08(Tunisia)	LEM-29/6/74	3262B	Agree	2.780
	LEM-15/1/74	3100C	Reject	-2.884
09(Libya)	LEM-15/1/74	3100C	Reject	-2.884
10(Mauritania)	NA-22/8/74	3349B	Reject	-2.884
11(Egypt)*				
12(Italy)*				

Tunisia - Actor

13(Algeria)	Act-24/3/74	3159C	Cooperate	4.674
14(Morocco)	LEM-2/3/74	3162A	Comment	0.108
	LEM-29/6/74	3262B	Agree	2.780
15(Libya)	NA-15/1/74	3100B	Cooperate	4.674
	AN-12/2/74	3128A	Protest	-1.982
16(Mauritania)				
17(Egypt)*	MJ-30/3/74	3193B	Comment	0.108
18(Italy)*				

CHART IV -- CONTINUED

FOREIGN POLICY
INTERACTION EVENTS
1974Libya - Actor

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
19(Algeria)				
20(Morocco)				
21(Tunisia)	NA-15/1/74 LEM-29/6/74	3100B 3262B	Cooperate Agree	4.674 2.780
22(Mauritania)				
23(Egypt)*	GD-19/2/74 NA-29/4/74 TT-25/5/74 AN/2/2/74	3119A 3201B 3225A 3128A	Propose Reject Deny Accuse	2.568 -2.884 -1.866 -2.653
24(Italy)*	R. Cairo-18/3/74 R. Tripoli-18/3/74	3184B 3184B	Comment Reject	0.108 -2.884

Mauritania - Actor

25(Algeria)	NA-22/8/74	3359A	Propose	2.568
26(Morocco)	LEM-30/1/74 NA-2/8/74	3102A 3349B	Comment Propose	0.108 2.568
27(Tunisia)	Act-15/1/74	3102B	Comment	0.108
28(Libya)				
29(Egypt)*				
30(Italy)*				

Egypt* - Actor

31(Algeria)	MJ-25/5/74 WA-1/4/74	3226C 3184C	Comment Comment	0.108 0.108
32(Morocco)				
33(Tunisia)	LEM-15/1/74	3100C	Approve	2.514

CHART IV -- CONTINUED
 FOREIGN POLICY
 INTERACTION EVENTS
 1974

Egypt* - Actor (Continued)

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
34(Libya)	ARB-15/9/74	3324B	Protest	-1.982
	TT-25/5/74	3225A	Accuse	-2.653
	NA-11/9/74	3357A	Reject	-2.884
	NA-29/4/74	3201B	Accuse	-2.653
	ARB-15/8/74	3314C	Demand	-3.181
35(Mauritania)				
36(Italy)*	R. Cairo-18/3/74	3184B	Grant	2.518

Italy* - Actor

37(Algeria)				
38(Morocco)				
39(Tunisia)				
40(Libya)				
41(Mauritania)				
42(Egypt)*	EGG-21/1/74	3120A	Comment	0.108

CHART V
FOREIGN POLICY
INTERACTION EVENTS
1975

Algeria - Actor

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
01(Morocco)	3rd World Rpt-1/76	3872B	Conflict	-3.441
02(Tunisia)	Act-4/11/75	3811C	Comment	0.108
	LM-22/7/75	3686A	Participate	2.459
03(Libya)	3rd World Rpt-1/76	3873B	Agree	2.780
04(Mauritania)	3rd World Rpt-12/75	3837B	Consult	2.942
05(Egypt)*				
06(Italy)*				

Morocco - Actor

07(Algeria)	3rd World Rpt-1/76	3872B	Conflict	-3.441
08(Tunisia)				
09(Libya)	LEM-4/3/75	3554C	Comment	0.108
	LM-8/1/75	3486B	Agree	2.780
10(Mauritania)	NA-13/6/75	3671C	Participate	2.459
	LEM-22/5/75	3678B	Agree	2.780
	NA-6/7/75	3711C	Agree	2.780
	LEM-4/6/75	3650A	Comment	0.108
	3rd World Rpt-12/75	3837B	Request	1.241
11(Egypt)*				
12(Italy)*				

Tunisia - Actor

13(Algeria)	Act-5/10/75	3783C	Comment	0.108
	LM-22/7/75	3686A	Participate	2.459
14(Morocco)				
15(Libya)	LM-8/8/75	3724B	Agree	2.780
	Act-29/3/75	3554B	Reject	-2.884
	LM-22/3/75	3554A	Request	1.241

CHART V -- CONTINUED
FOREIGN POLICY
INTERACTION EVENTS
1975

Tunisia - Actor (Continued)

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
16(Mauritania)				
17(Egypt)*				
18(Italy)*				

Libya - Actor

19(Algeria)	3rd World Rpt-1/76	3873B	Agree	2.780
20(Morocco)	LEM-11/2/75	3524C	Comment	0.108
	LM-8/1/75	3486B	Agree	2.780
21(Tunisia)	LM-8/8/75	3724B	Agree	2.780
	LM-22/3/75	3554A	Grant	2.518
22(Mauritania)				
23(Egypt)*	NA-11/8/75	3723A	Reject	-2.884
	EGG-15/6/75	3674A	Accuse	-2.653
	TT-2/9/75	3774C	Accuse	-2.653
	NA-17/4/75	3586B	Threat	-3.342
24(Italy)*				

Mauritania - Actor

25(Algeria)	3rd World Rpt-12/75	3837B	Consult	2.942
26(Morocco)	NA-13/6/75	3671C	Participate	2.459
	LEM-22/5/75	3678B	Agree	2.780
	NA-6/7/75	3711C	Agree	2.780
	3rd World Rpt-12/75	3836B	Reject	-2.884
27(Tunisia)	Act-20/5/75	3622B	Comment	0.108
28(Libya)				
29(Egypt)*	Egg-27/5/75	3621C	Comment	0.108
30(Italy)*				

CHART V -- CONTINUED
FOREIGN POLICY
INTERACTION EVENTS
1975

Egypt* - Actor

<u>Target</u>	<u>Source^a</u>	<u>Page^b</u>	<u>Concept^c</u>	<u>Value^d</u>
31(Algeria)				
32(Morocco)	LEM-6/9/75	3753A	Comment	0.108
33(Tunisia)				
34(Libya)	EGG-20/6/75	3674A	Accuse	-2.653
	TT-9/7/75	3686A	Accuse	-2.653
	D Tel-29/7/75	3694C	Expel	-3.062
	NA-27/8/75	3723B	Conflict	-3.441
	FT-30/5/75	3641B	Protest	-1.982
	NA-17/4/75	3586B	Reject	-2.884
35(Mauritania)				
36(Italy)*				

Italy* - Actor

37(Algeria)
38(Morocco)
39(Tunisia)
40(Libya)
41(Mauritania)
42(Egypt)*

NOTES: a. Original source of news item and date as cited by the Africa Research Bulletin. The following abbreviations were used:

Act: L'Action(Tunis); AN: Afrique Nouvelle; ARB: Africa Research Bulletin; D Tel: Daily Telegraph(London); EGG: Egyptian Gazette; FT: Financial Times(London); GD: Guardian(London); LEM: Le Matin(Morocco); LM: Le Monde (Paris); MAC: Le Moniteur Africain du Commerce et de l'Industrie; MJ: El Moudjahid(Algiers); NA: News Agencies; TT: The Times(London); R: Radio(BBC Monitoring).

CHART V -- CONTINUED

FOREIGN POLICY
INTERACTION EVENTS
Notes (Continued)

- NOTES: b. Africa Research Bulletin page number and column.
- c. Calhoun's descriptive - see Chart II, page 26.
- d. Calhoun's scale value - see Chart II, page 26.
- * Non-member of the postulated region of North Africa.

The absence of information following a target country line indicates that during the year covered, the Africa Research Bulletin contained no news items in which the actor had directed a foreign policy action toward that particular target state.

On the basis of this dyadic information, graphic representations of the aggregate interactive network of the survey group and the postulated region during the years 1973-1975 were drawn (Figures 1 & 2).

What we have in these resultant graphs is a very gross representation of the interactive structure as suggested by the events contained in our source for the total three year survey period. In these graphs, directed lines from initiator to recipient represent the occurrence of at least one dyadic foreign policy interaction between the pairs of states sometime during the three year survey period. By applying techniques and theorems of linear graph theory to these gross representations, we may begin to gain some useful information about foreign policy relationship patterns which are suggested by our very limited data.⁶⁵

If we consider only reciprocal interactions, the pattern depicted in Figure 1 (Foreign Policy Interactive Structure, Survey Group, Aggregate 1973-1975) forms a component graph of three subgraphs.⁶⁶ The primary subgraph, consisting of Algeria, Morocco, Tunisia, Libya and Mauritania (all members of the postulated region), forms what is known as a complete graph.⁶⁷ The secondary subgraph consists of Tunisia, Libya and Egypt and also forms a complete graph. Note too that while Egypt is drawn into a pattern of interaction with the postulated region through

FIGURE 1

FOREIGN POLICY INTERACTIVE STRUCTURE
SURVEY GROUP
AGGREGATE 1973-1975

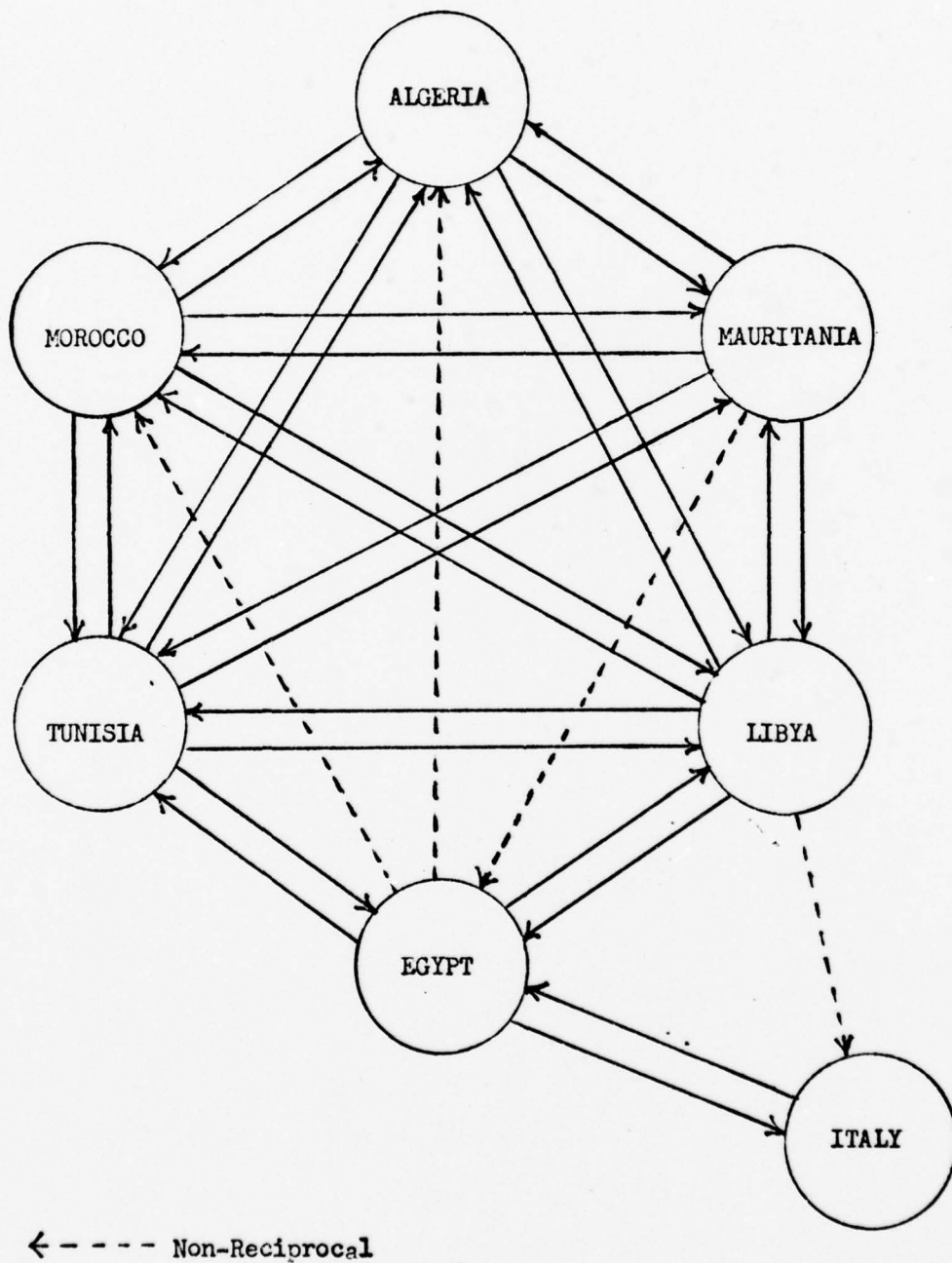
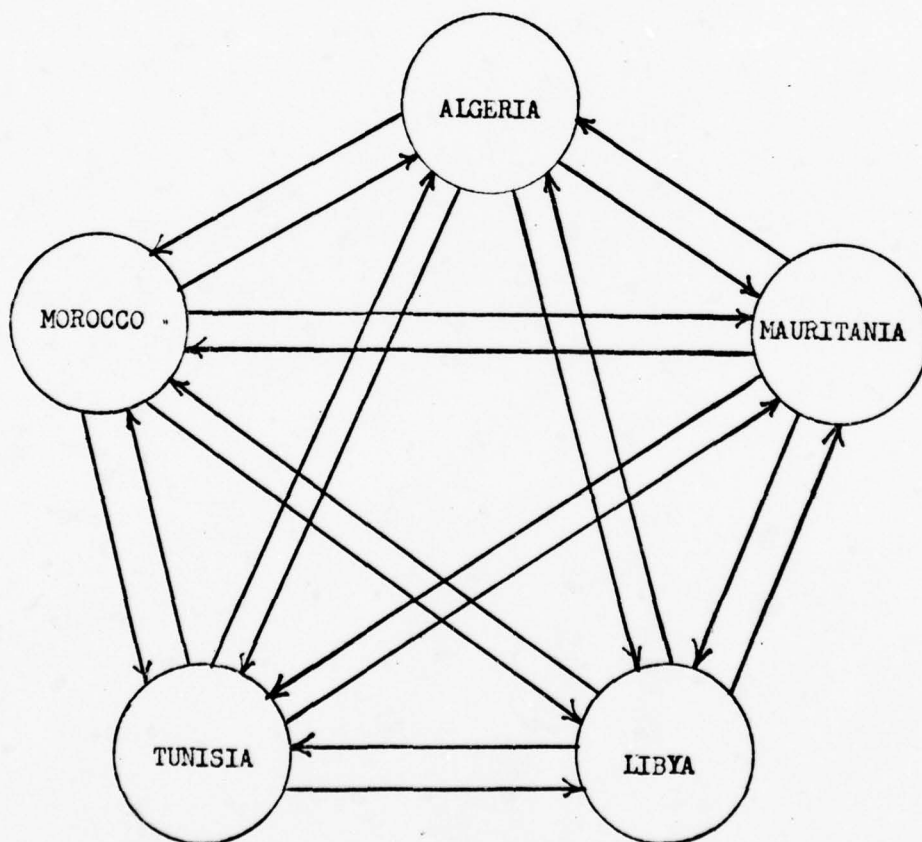


FIGURE 2

FOREIGN POLICY INTERACTIVE STRUCTURE
POSTULATED REGION
AGGREGATE 1973-1975



her strong connections with Tunisia and Libya, she had no reciprocal interactions with Morocco, Algeria nor Mauritania (the other three members of the postulated region) during the three year survey period. The third subgraph consists of Egypt and Italy. It is apparent here that Egypt acted as an articulation point between Italy and the other members of the survey group and that without Egypt, Italy would have dropped out completely from the network which emerged during the 1973-1975 period.

Density is another rather gross measure of intra-systemic communication which can be examined at this point. "The density of any network can be defined as the ratio of actual links to all possible links."⁶⁸ Thus, in the case of our aggregate graph of the entire survey group, the ratio is 30:42, which indicates a density of .71.

Figure 2 depicts the aggregate foreign policy interactive structure of the postulated region during the survey period. As noted in our analysis of the survey group structure, the five states which make up the postulated region form a complete graph. Thus, looking at the aggregate period 1973-1975, we find that no member of the postulated region ignored any other member and that no single state stands out as a nexus of foreign policy interaction. The ratio of actual links to all possible links for the aggregate graph of the postulated region is 20:20, which indicates a maximum density of 1.00.

When we contrast and compare the gross patterns which emerge in Figures 1 and 2, we see a progressive weakening in foreign policy network linkages as we move from the postulated region to Egypt and finally to Italy. The postulated region has a maximum density with some reciprocal interaction having occurred between every pair of states during the three year survey period. At the next level is Egypt which was more loosely linked to the regional grouping through reciprocal interactions with Tunisia and Libya while being entirely ignored by Morocco and Algeria and ignoring Mauritania. Finally there is Italy with no reciprocal foreign policy linkages with any member of the postulated region and her only tie to the remaining survey group network being through Egypt. We also note that while by itself the postulated region has a maximum network density of 1.00, when Egypt and Italy (our control factor states) are added to that network, the density drops by over 25% to .71. Over all, it would seem that while the gross foreign policy graphs suggest a difference between the network pattern of the members of the postulated region and the two control factor states, they do not suggest any difference between the members of the postulated core and those of the postulated periphery.

We now turn to other, more precise approaches which may begin to reveal differences in foreign policy relationships not apparent in our first broad slice. A

frequency count of events passing between states provides an indication of intensity of interaction.⁶⁹ Looking first at the survey group as a whole, a total of 122 events were coded for the three year period and, excluding 10 nonreciprocal events, we find the following: Libya, with 28 events, initiated more interactions within the survey group than did any other state. Morocco and Tunisia with 21 events each were next, followed by Egypt with 20, Algeria with 17, Mauritania with 14 and Italy with only 1. Not much is apparent here except that Libya (a member of the postulated periphery) had a frequency well above the average, while Italy (a control factor state) had almost no interaction at all.

Next, we take a frequency count of foreign policy events between states of the postulated region only. Among these five states, a total of 90 events were coded for the three year period and, excluding 4 nonreciprocal events, we find the following: Morocco, with 21 events, initiated more interactions among the postulated region grouping than did any other state. Tunisia, with 20, was next, followed by Algeria with 17 and Libya and Mauritania tying for last with only 14 each.

When we contrast and compare the frequency interaction of the survey group as a whole with that of the postulated region, several patterns are suggested. First, it is clear that the interaction between Libya and Egypt

(Libya's geographic neighbor but non-member of the postulated region) was great during the period 1973-1975 and resulted in high frequency counts within the total survey group for both of these states. Thus while Egypt's interaction with Libya was high in terms of frequency, only Italy was lower in foreign policy interaction frequency with the other states of the survey group than Egypt. Second, the weakening effect of Egypt and Italy on the foreign policy interaction network was also indicated by the fact that 6 of the 10 nonreciprocal events recorded involved these two control factor states. An examination of the frequency count within the postulated regional grouping only reveals that the three states which comprise Cantori and Spiegel's core seemed to display more intense interaction within that five state group than did the two postulated peripheral states. Thus, in terms of gross intensity of foreign policy interaction (as measured by frequency count), we see not only indications of boundary demarcation between the members of the postulated region and the two control factor states, but a core/periphery pattern within the postulated regional grouping as well which seems to match the structure suggested by the Cantori and Spiegel model.

In order to make an assessment of the qualitative content of foreign policy communications within the survey group and the postulated region, a weighted average of

Calhoun scale values was computed for each pair of states over the entire three year period by applying the Calhoun values (which we had previously assigned to each event as listed in Charts III through V) to the following formula:⁷⁰

$$WA = \frac{f(p) - u(n)}{f + u}$$

Where: f = number of favorable events (those with positive Calhoun scale values).

u = number of unfavorable events (those with negative Calhoun scale values).

p = the sum of positive Calhoun scale values.

n = the sum of negative Calhoun scale values.

The resulting weighted averages for the three year period are displayed in matrix form (at the center of each square) in Figure 3. The numbers in the upper right hand corners are the event frequency for each pair of interacting states. Note that the positive quality numbers represent co-operative behavior while the negative sign indicates unco-operative behavior. The average for the entire survey group of seven states is 3.18, indicating that the overall behavior was co-operative. Looking at the five states which comprise the postulated region, the average is 5.77; for the postulated core, 4.79; and for the postulated peripheral states, the average is 5.51. Here we see that the presence of the two control factor states resulted in a marked increase in the level of unco-operative

FIGURE 3

FOREIGN POLICY CONTENT & FREQUENCY MATRIX.
AGGREGATE 1973-1975

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	³ -2.70	⁷ 17.50	⁴ 8.45	⁴ 11.02		
	Morocco	⁴ -2.37	⁴ -.10	⁷ -4.91	⁷ 8.68		
	Tunisia	⁷ 15.12	⁴ 1.29	⁷ 4.97	² 2.89	¹ .11	
	Libya	³ 8.34	⁴ -1.32	⁵ 12.86	² 5.29	¹¹ -15.58	² -1.39
	Mauritania	⁴ 10.80	⁷ 10.91	³ 3.00	² 5.72	¹ .11	
	Egypt	² .22	¹ .11	¹ 2.51	¹⁸ -8.69		¹ 2.52
	Italy					¹ .11	

behavior. When we analyze the states of the postulated region, we note that not only was behavior more co-operative between Libya and Mauritania than among the postulated core states, but that co-operation between members of the core and periphery groups was better than it was within either of these subgroups.

The next step is designed to gain a gross pattern of the degree of influence members of the surveyed states have with other states in the group. As a means of measuring gross influence, the Boyd model draws upon a concept from the field of psychology. In their observations of small groups of people, psychologists have noted that ". . . the greater a group member's influence over the other group members, the higher the proportion of communication he tends to receive from them rather than send to them."⁷¹ By treating our seven states as a small group of individual actors, we can gain an indication of the influence each state has over other group members by drawing upon the frequency count figures in Figure 3 and determining proportions between the number of messages received and sent for each state during the three year survey period.

When we examine the frequency ratio of foreign policy messages sent and received within the survey group as a whole, Libya was not only involved in more interactions than any other state, but seemed to exert more influence, having received 38 event inputs while initiating only 30.

Algeria and Italy were next in apparent influence both having received 2 more event inputs than they initiated. The remaining four states all demonstrated an apparent lack of influence in varying degrees ranging from Tunisia, which initiated 1 more event than she received, followed by Mauritania with 2 more, Morocco with 3 more and Egypt least influential of all with an initiating imbalance of 6.

Turning to an examination of the frequency ratio of foreign policy messages sent and received among members of the postulated region only, we note that while Morocco, a postulated core member, was involved in more interactions than any other state. Libya, one of the postulated periphery states, seemed to exert more influence having received 20 event inputs while initiating only 14 outputs over the three year period. Morocco was next in apparent influence with a difference of 4, then Algeria, having sent and received the same number, followed by Tunisia and Mauritania which both initiated 1 more event than they received.

In general, these indications of relative co-operation and influence do not seem to fit the framework which is suggested by the Cantori and Spiegel model. When we examine the impact of the two control factor states on the pattern of co-operation and influence, Egypt appears to have had the least influence of any of the seven states,

as might be expected of a non-member of the postulated region. Counterbalancing Egypt's expected behavior, however, was that of Italy, the other control factor state, which tied with Algeria as the second most influential state of the survey group.

By applying the total number of positive and negative foreign policy events which occurred between each pair of states to the Calhoun Tension Index, below, it is possible to gain an indication of the degree to which each pair of states was favorably or unfavorably disposed toward one another over the three year survey period:⁷²

$$T = \frac{P - N}{P + N + \frac{ne}{2}}$$

Where: T = tension (or disposition)

P = total number of scaled positive events.

N = total number of scaled negative events.

ne = total number of neutral events.

P and N values were extracted from Charts III through V and applied to the formula. Results of the calculations are displayed in the Tension-Disposition Matrix at Figure 4. Note that this formula yields a normalized disposition scale value ranging from 1.00 to -1.00. Applying these normalized values to a related series of operations, we were able to gain three more indications of the nature of foreign policy relations among the members of our survey

FIGURE 4

FOREIGN POLICY TENSION-DISPOSITION MATRIX
AGGREGATE 1973-1975

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	-.33	1.00	1.00	1.00		
	Morocco	0.00	0.00	-.14	.71		
	Tunisia	1.00	.50	.43	1.00		
	Libya	1.00	0.00	1.00	1.00	-.43	0.00
	Mauritania	1.00	.71	1.00	1.00	1.00	
	Egypt	1.00	1.00	1.00	-.22		1.00
	Italy					1.00	

group and the postulated region throughout the period 1973-1975.

The first of these operations is a Cohesion Index which gives an indication of the level of solidarity within the group in terms of foreign policy interactions. Cohesion Indexes were calculated using the following formula:⁷³

$$C = \frac{\text{Sum of all disposition indexes in group}}{N(N - 1)}$$

Where: N = Number of members in the group

The value of the Cohesion Index ranges from -1.0 (disintegration) to 1.0 (consolidation).

The next operation is an Esteem Index which gives an indication of the level of value placed upon the group by a given member in terms of foreign policy interactions. Esteem Indexes were calculated using the following formula:⁷⁴

$$E = \frac{\text{Sum of row marginals by actor}}{N - 1}$$

Where: N = Number of members in the group

The value of the Esteem Index also ranges from -1.0 (unfavorably disposed toward other system members) to 1.0 (favorably disposed toward other system members).

The final operation conducted using the aggregate grouping for the period 1973-1975 was an Acceptance Index which gives an indication of the degree to which each

group member is accepted or rejected by its fellow members in terms of foreign policy interactions. Acceptance Indexes were calculated using the following formula:⁷⁵

$$A = \frac{\text{Sum of column marginals by recipient}}{N - 1}$$

Where: N = Number of members in the group.

As with the indexes above, the value of the Acceptance Index also ranges from -1.0 (generally rejected by its fellow members) to 1.0 (generally accepted by its fellow members).

Indexes for all three of these operations (C, E, A) were taken from the matrix at Figure 4 and the results are broken down by survey group, postulated region, core, periphery, and control group in Table 3.

At this point let us summarize the indications offered by our aggregate analysis of the foreign policy relationships within the survey group. The aggregate graphical constructions and gross density analysis seem to indicate a strong foreign policy network among the five states of the postulated region, with a progressive weakening as we move out from those five, first to Egypt and then to Italy. In terms of frequency of interactions, while there was a high level of activity between Libya (a member of the postulated periphery) and Egypt (a control factor state), foreign policy activity was greater among the states of the postulated region. When we

TABLE 3
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
AGGREGATE ANALYSIS 1973-1975

Survey Group

Cohesiveness of Survey Group = .434

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.445	.667
Morocco	.095	.313
Tunisia	.488	.667
Libya	.428	.345
Mauritania	.785	.618
Egypt	.630	.262
Italy	.167	.167

Postulated Region

Cohesiveness of total Region = .644

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.668	.750
Morocco	.143	.220
Tunisia	.733	.750
Libya	.750	.573
Mauritania	.928	.928

Postulated Core

Cohesiveness of total Core = .362

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.335	.500
Morocco	.000	.085
Tunisia	.750	.500

Postulated Periphery

Cohesiveness of Periphery = 1.00

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Libya	1.000	1.000
Mauritania	1.000	1.000

TABLE 3 -- CONTINUED
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
AGGREGATE ANALYSIS 1973-1975

Control Group

Cohesiveness of Control Group = 1.00

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Egypt	1.000	1.000
Italy	1.000	1.000

examine quality of foreign policy behavior, co-operation was considerably greater among the members of the postulated region as a group than was the case when the two control factor states were included. In like manner, the cohesiveness of the survey group and the general levels of esteem and acceptance enjoyed by states of the postulated region were reduced by the presence of the two control factor states. All of these observations seem to indicate that in the area of foreign policy relationships a grouping of the five states which make up the postulated region of North Africa could have existed from 1973-1975. Evidence of any sub-groupings such as a core or periphery, as postulated by Cantori and Spiegel, is meager. The greater intensity of foreign policy interactions among Algeria, Morocco and Tunisia, in comparison with Libya and Mauritania, is the only evidence offered in support of the postulated core and periphery of the Cantori and Spiegel model. The results of the qualitative content analysis, as well as all the remaining aggregate measurements taken, support the possibility of a group of five states, but not a further breakdown into a core and periphery in which we would expect the quality of core interactions to exceed that of periphery interactions.

In sum, our aggregate analysis yielded no strong indications which would either tend to support or refute the Cantori and Spiegel North African model. With our

aggregate analysis as background, let us now turn to a time-series analysis.

CHAPTER III

FOREIGN POLICY RELATIONSHIPS TIME-SERIES ANALYSIS

The completed aggregate phase of our analysis was capable of presenting suggestions of a static nature about foreign policy relations within the survey group over the entire period from 1973-1975. We will now undertake essentially the same operations on the same event data, but this time broken down by year. This second step complements the aggregate analysis and should enable us ". . . to discern trends, patterns and regularities in the structure and content of those relationships which characterize. . ." ⁷⁶ the group of states under investigation.

Our first step in the time-series analysis was to construct separate graphic representations of the foreign policy interactive networks for the survey group and the postulated region of North Africa for each of the three years covered by our data (Figure 5 - 10). Comparing the three survey group structures (Figures 5, 7 & 9), we immediately note the almost total isolation of Italy (one of the two control factor states) from the remaining six states in terms of foreign policy interaction. In 1973

FIGURE 5

FOREIGN POLICY INTERACTIVE STRUCTURE
SURVEY GROUP
1973

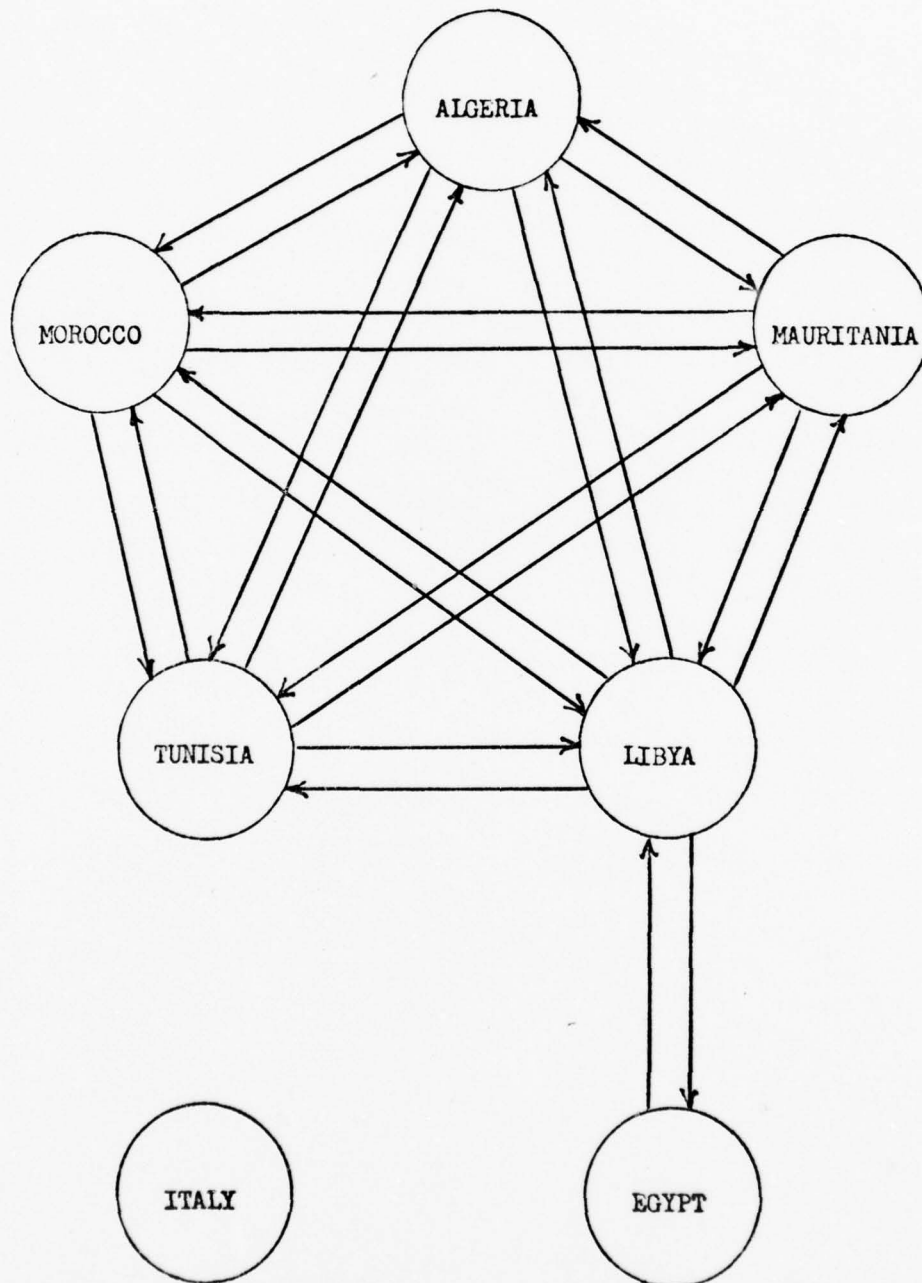


FIGURE 6

FOREIGN POLICY INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
1973

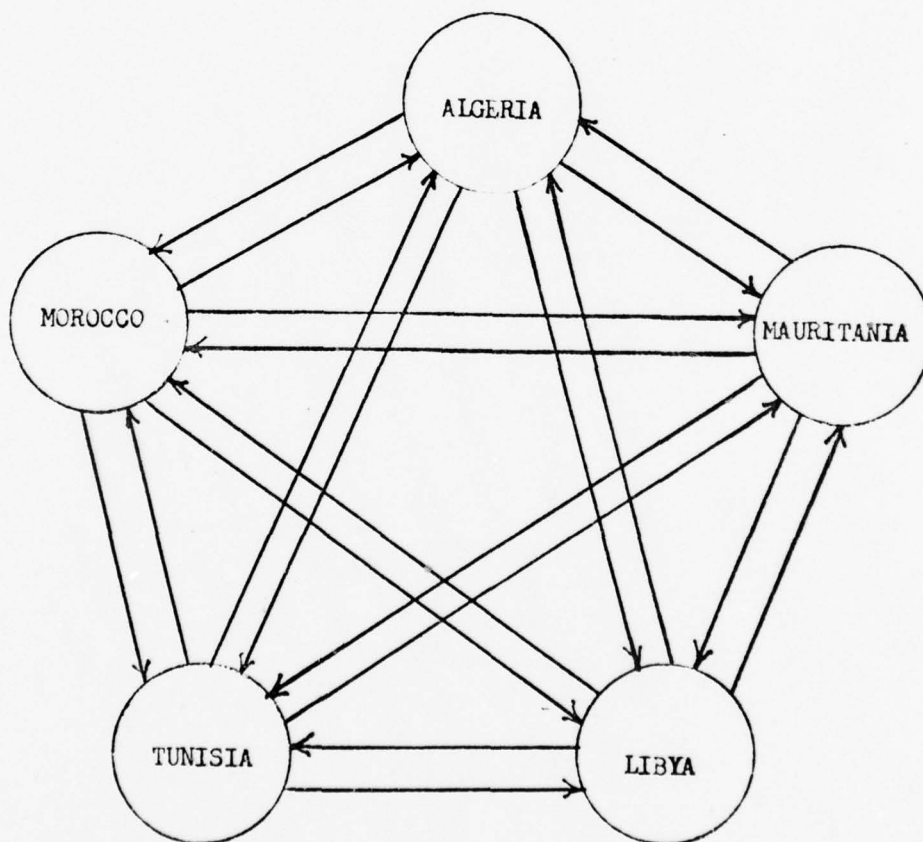
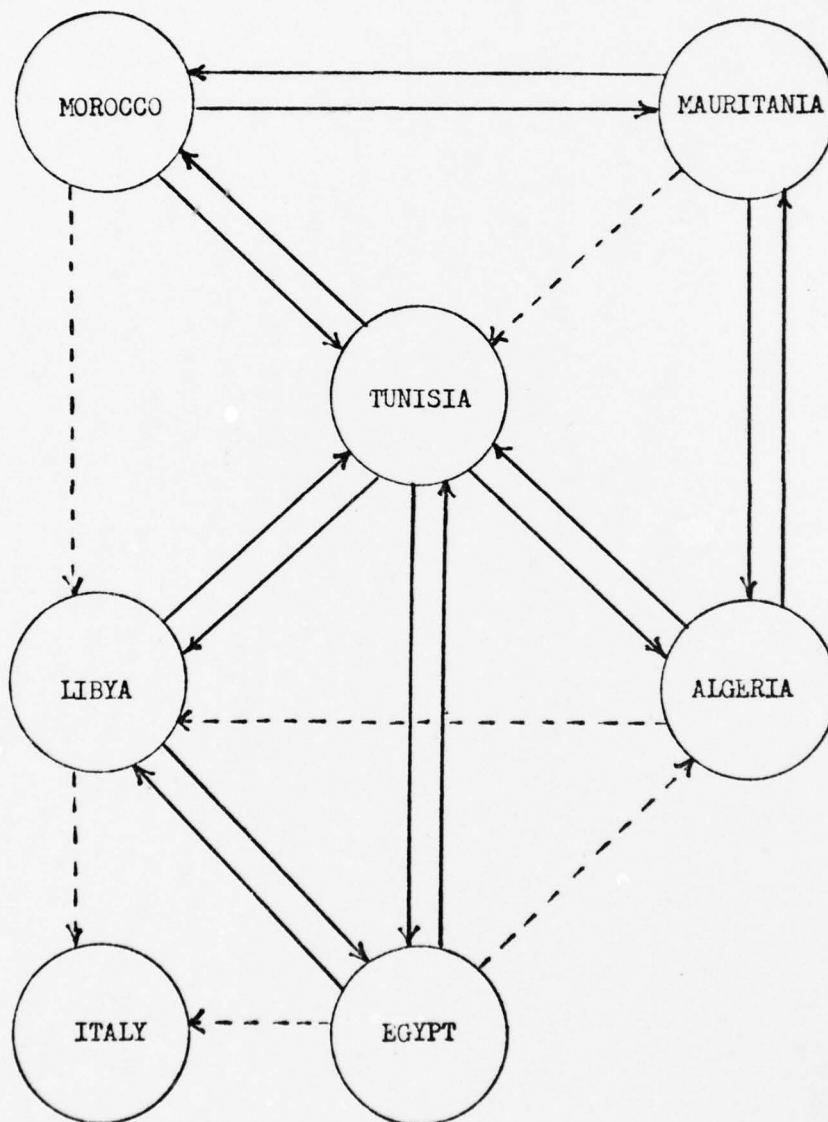


FIGURE 7

FOREIGN POLICY INTERACTIVE STRUCTURE
SURVEY GROUP
1974



← - - - - Non-Reciprocal

FIGURE 8

FOREIGN POLICY INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
1974

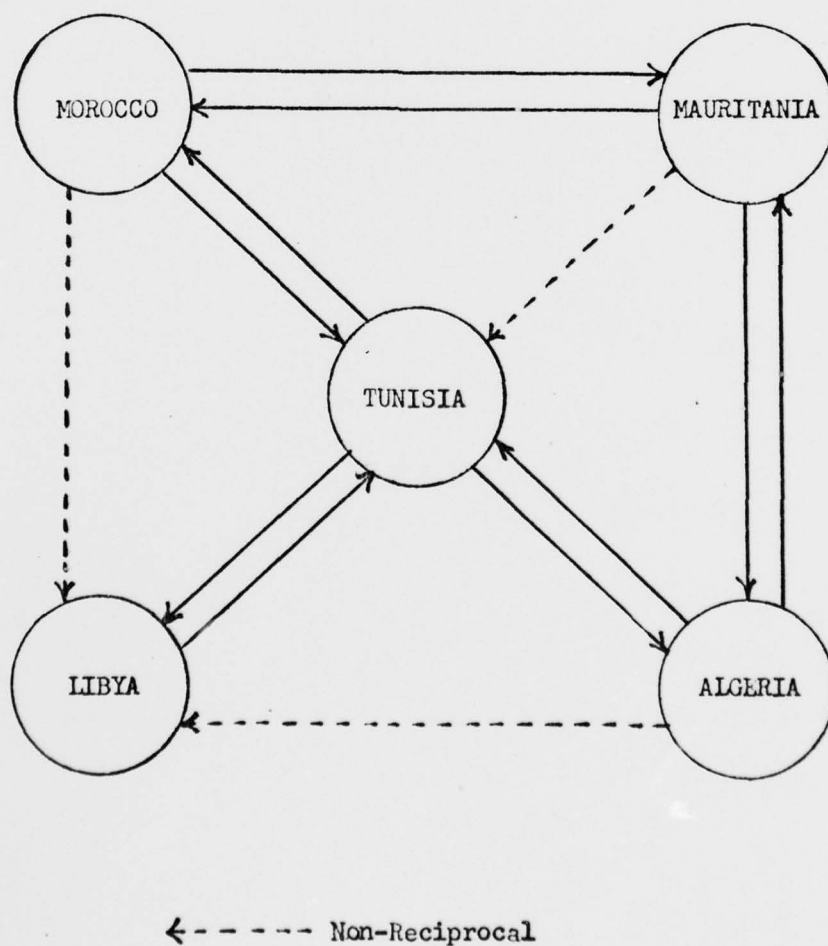
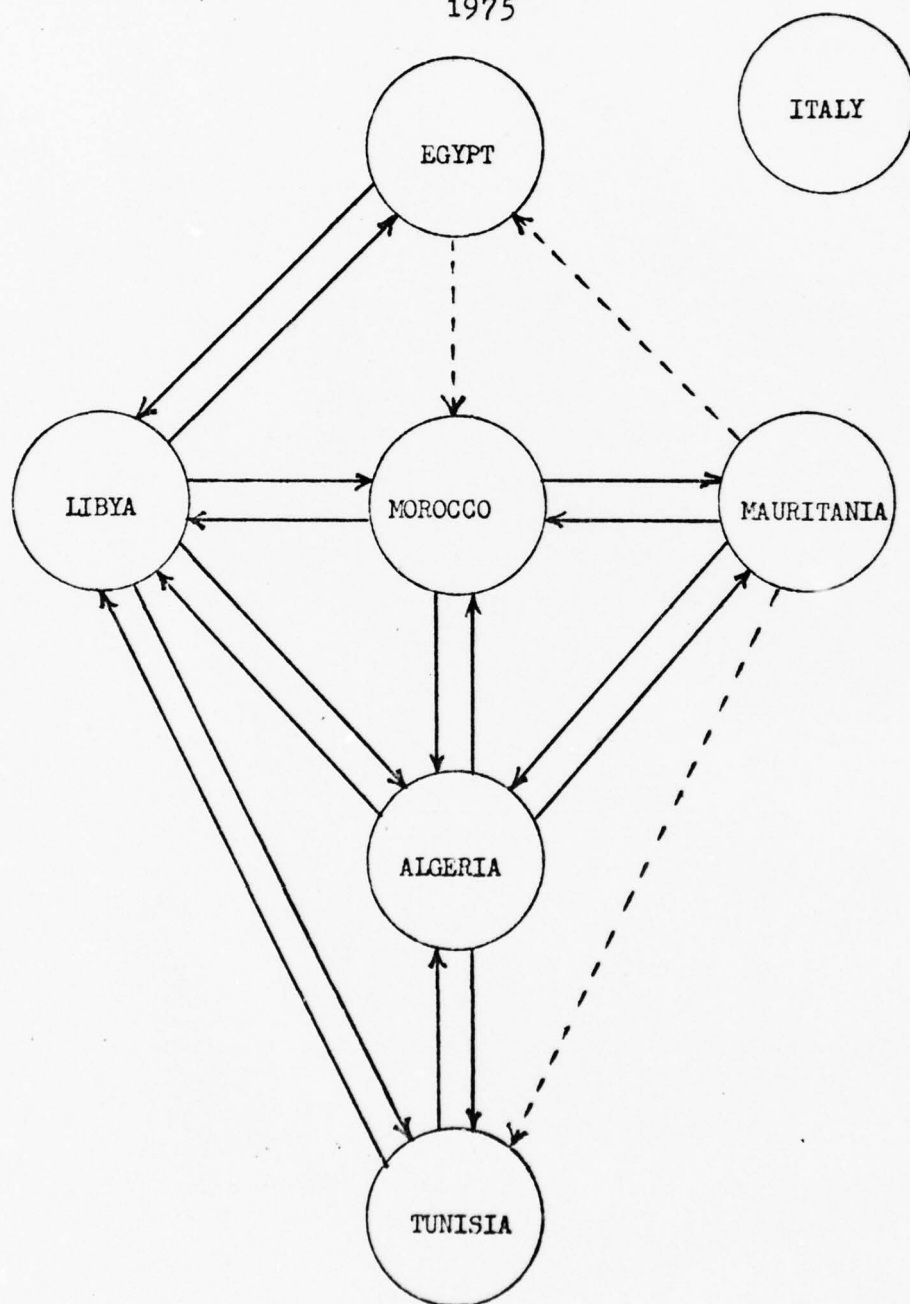


FIGURE 9

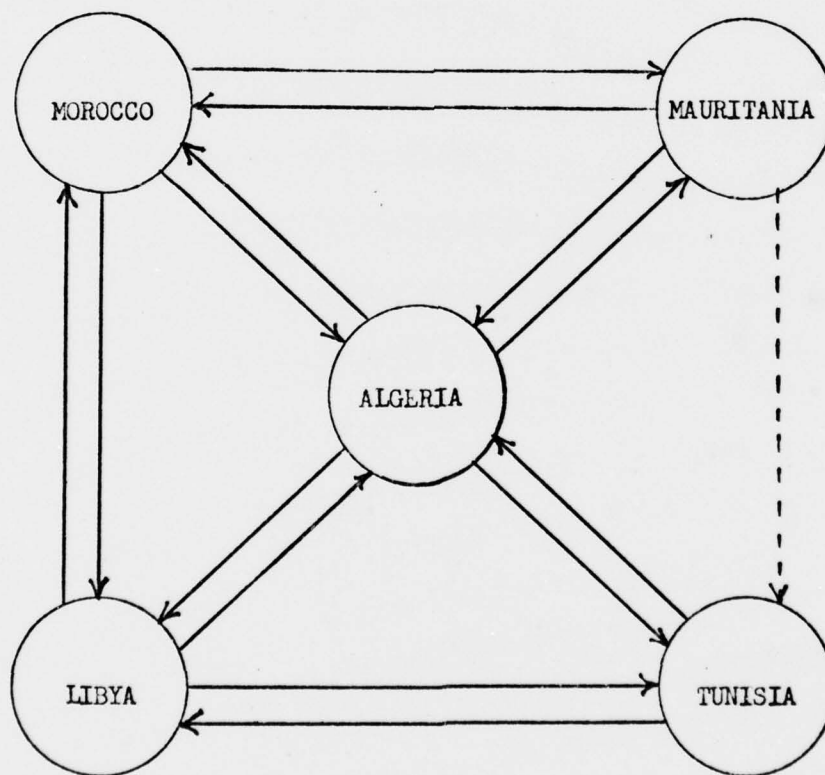
FOREIGN POLICY INTERACTIVE STRUCTURE
SURVEY GROUP
1975



← - - - Non-Reciprocal

FIGURE 10

FOREIGN POLICY INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
1975



← - - - - Non-Reciprocal

and 1975, Italy was not linked into the network at all; in 1974 she was linked only marginally by nonreciprocal interactions with Egypt and Libya. In similar manner, the links between Egypt (the other control factor state) and the remaining states were relatively weak in all three years. In 1973 and 1975, her only reciprocal links with the group network were through Libya, her geographic neighbor; in 1974 Egypt's reciprocal links, while still relatively weak, included Tunisia as well as Libya. Thus, in terms of foreign policy network linkages, our graphic analysis suggests that while there are strong ties between Egypt and Libya, there appears to be a boundary demarcation between the states of the postulated region and the control factor states in each of the surveyed years.

An analysis of the three postulated region structures (Figures 6, 8 & 10) indicates that 1973 was a unique year in the period surveyed; it is the only complete graph and therefore 1973 was the only year in which there is indication that each state communicated with every other member of the postulated region group. In 1974, Tunisia was a nexus of interaction and Libya was rather isolated, having carried on reciprocal interaction with only Tunisia. In 1975, the focus shifted to Algeria as a nexus of interaction with Mauritania and Tunisia somewhat on the fringes of the group. What seems to be indicated by our data is a wide swing in patterns of interaction within the

postulated region grouping over the three year period, from total interaction in 1973 to rather meager interaction the following year and with Tunisia moving from the very nexus of interaction in 1974 to a fringe position the following year. No trends seem to be suggested by the graphic representations and while there is evidence to suggest the presence of a North African region, there is little to indicate the existence of a stable core and periphery as postulated by the Cantori and Spiegel model.

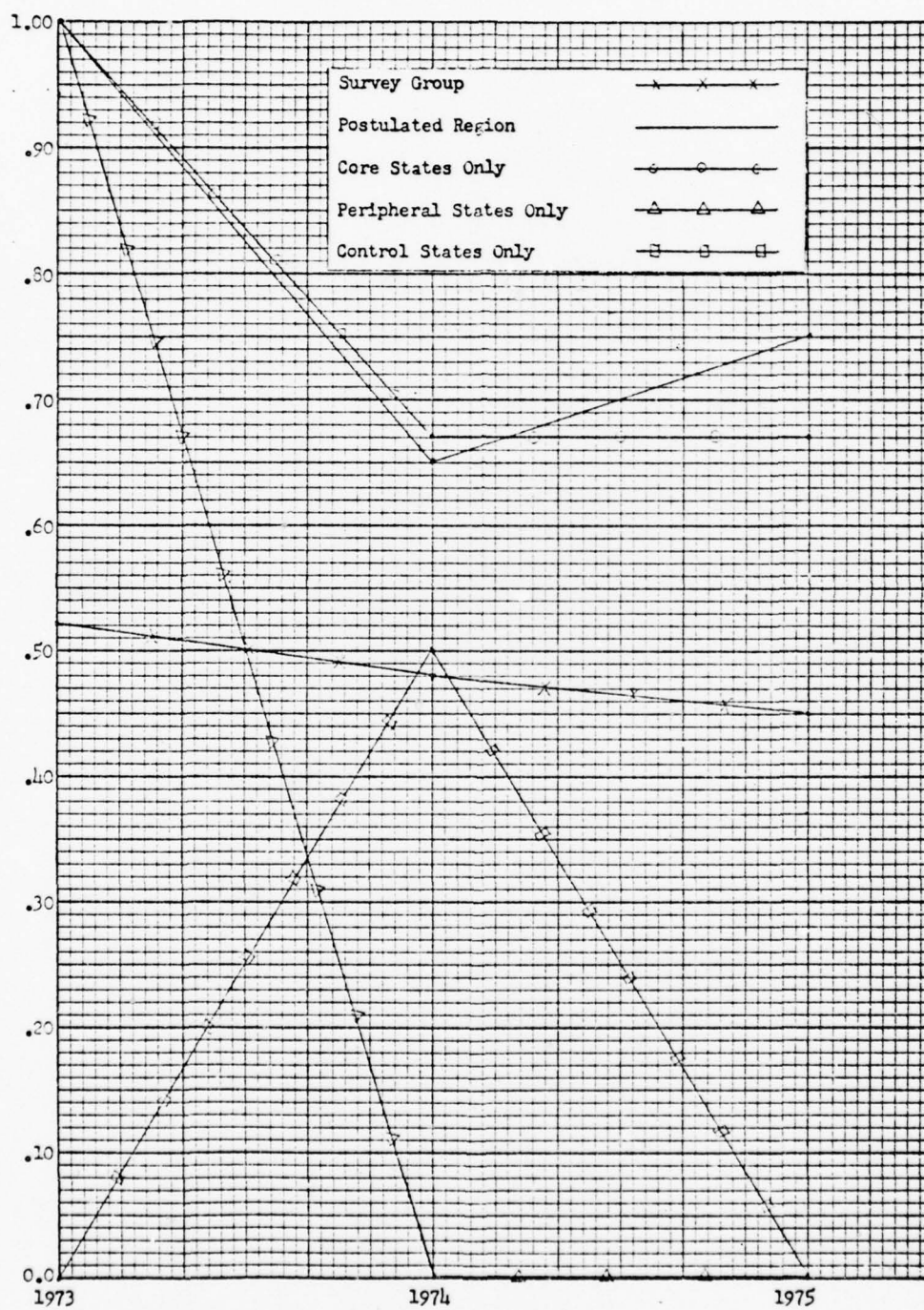
Turning to the density of the yearly graphs for a gross measure of intra-systemic foreign policy communications, we find the following:

TABLE 4
FOREIGN POLICY EVENT DENSITY

	<u>1973</u>	<u>1974</u>	<u>1975</u>
Survey Group	22:42 (.52)	20:42 (.48)	19:42 (.45)
Total Region	20:20 (1.00)	13:20 (.65)	15:20 (.75)
Core States Only	6:6 (1.00)	4:6 (.67)	4:6 (.67)
Peripheral States Only	2:2 (1.00)	0:2 (.00)	0:2 (.00)
Control States Only	0:2 (.00)	1:2 (.50)	0:2 (.00)

An examination of foreign policy event density plots (Figure 11) suggests that the intra-systemic communications of the total survey group declined steadily over the three year period. When we compare density of communications within the total survey group with the density of

FIGURE 11
FOREIGN POLICY EVENT DENSITY
TIME-SERIES PLOTS



the postulated region only, it is clear that inclusion of the two control factor states (Egypt and Italy) held density of the survey group well below that of the postulated region throughout the period, with the greatest differences occurring in 1973 and 1975. This comparison supports the existence of a five state North African region in each of the years covered by our data.

Looking at the postulated region and its postulated sub-components, we note that while density suggests fairly high intra-systemic communications for the postulated region throughout the three year period, it was at its peak in 1973, slumped in 1974 and increased again in 1975. Comparing the postulated core states with the peripheral states, we note again that 1973 was a singular year in our selected time period and that except for that year, densities of the two sub-groups were almost constant, with a high density indicated within the Algeria/Morocco/Tunisia group and a zero density indicated within the Libya/Mauritania group. Thus, density examined on a year by year basis tends to support the Cantori and Spiegel model as did the aggregate foreign policy density analysis.

Next, using the same procedure that was employed in the aggregate analysis, we constructed a Foreign Policy Content and Frequency Matrix for each of the three years covered by our data (Figures 12, 13 & 14). By taking event count figures from the upper right corners of blocks in

FIGURE 12
FOREIGN POLICY CONTENT & FREQUENCY MATRIX
1973

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	² .32	³ 10.23	² 5.56	² 5.29		
	Morocco	³ -.87	² -.05	⁴ -5.94	¹ 1.24		
	Tunisia	⁴ 10.34	² -.10	² .22	² 2.89		
	Libya	² 5.56	² -5.54	¹ .11	² 5.29	⁶ 1.91	
	Mauritania	² 5.29	¹ 2.51	¹ 2.78	² 5.72		
	Egypt			⁵ 22.23			
	Italy						

FIGURE 13

FOREIGN POLICY CONTENT & FREQUENCY MATRIX
1974

		<u>Recipient</u>						
		Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria			² 4.78	¹ .12	¹ 2.78		
	Morocco			² -.10	¹ -2.88	¹ -2.88		
	Tunisia	¹ 4.67	² 2.89		² 1.35		¹ .11	
	Libya			² 7.45			⁴ -4.90	² -1.39
	Mauritania	¹ 2.57	² 2.68	¹ .11				
	Egypt	² .11		¹ 2.51	⁷ -8.79			¹ 2.52
	Italy						¹ .11	

FIGURE 14

FOREIGN POLICY CONTENT & FREQUENCY MATRIX
1975

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	1 -3.44	2 2.57	1 2.78	1 2.94		
	Morocco	1 -3.44		2 2.89	5 9.37		
	Tunisia	2 2.57		3 2.27			
	Libya	1 2.78	2 2.89	2 5.30		4 -11.53	
	Mauritania	1 2.94	4 5.29	1 .11		1 .11	
	Egypt		1 .11	6 -16.68			
	Italy						

each matrix, we were able to construct Table 5, which allows a yearly comparison of the gross intensity of foreign policy interactions by state.

TABLE 5
FOREIGN POLICY EVENT GROSS INTENSITY

<u>Unit</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Algeria	9:53(17%)	4:38(11%)	5:41(12%)
Morocco	10:53(19%)	4:38(11%)	8:41(20%)
Tunisia	10:53(19%)	6:38(16%)	5:41(12%)
Libya	13:53(25%)	8:38(21%)	9:41(22%)
Mauritania	6:53(11%)	4:38(11%)	7:41(17%)
Egypt	5:53(9%)	11:38(29%)	7:41(17%)
Italy	0:53(0%)	1:38(3%)	0:41(0%)
Region	48:53(91%)	26:38(83%)	34:41(83%)
Core States Only	29:53(55%)	14:38(37%)	18:41(44%)
Peripheral States Only	19:53(36%)	12:38(32%)	16:41(39%)
Control States Only	5:53(9%)	12:38(32%)	7:41(17%)

An examination of foreign policy gross intensity plots (Figure 15), suggests no new patterns. The somewhat higher intensity of interactions among postulated core states as compared with that of the postulated peripheral states does tend to support the Cantori and Spiegel model.

When Calhoun's scale values were extracted from Figures 12 through 14, and averaged by year, we were able to construct Table 6, which offers comparisons of co-operative and unco-operative behavior.

FIGURE 15

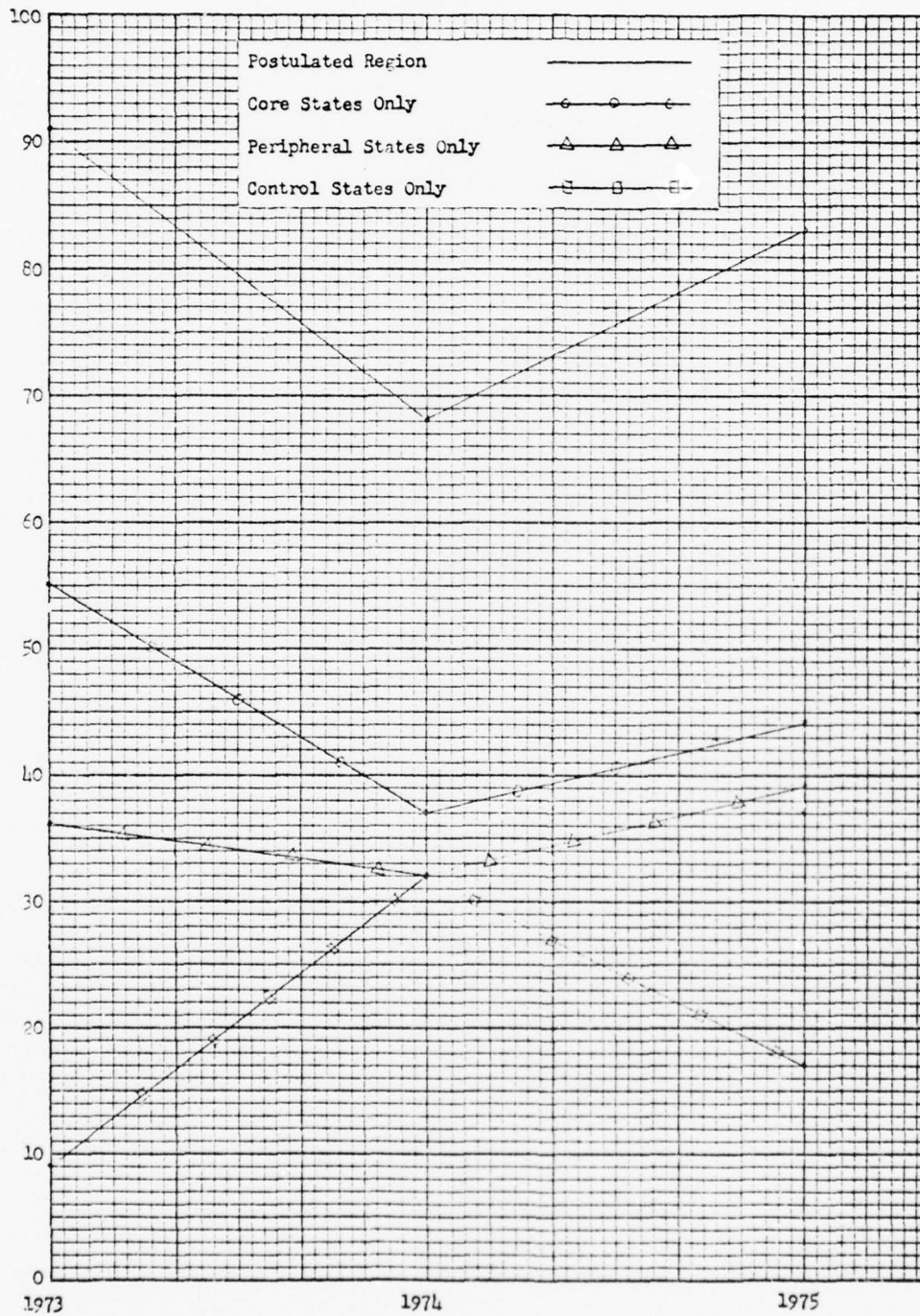
FOREIGN POLICY GROSS INTENSITY
TIME-SERIES PLOTS

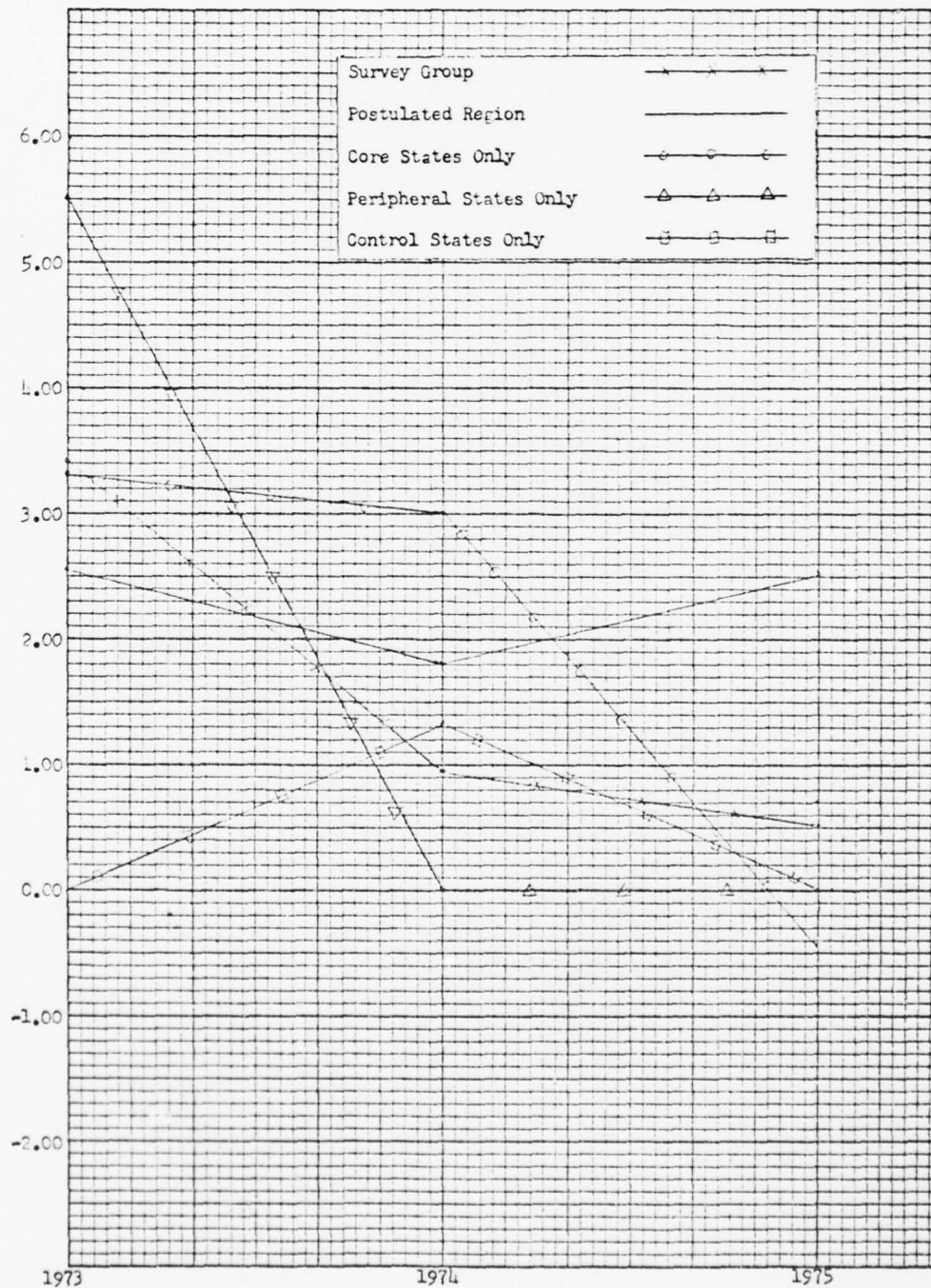
TABLE 6

FOREIGN POLICY EVENT AVERAGE LEVELS OF CO-OPERATION

	<u>1973</u>	<u>1974</u>	<u>1975</u>
Survey Group	3.41	0.95	0.52
Total Region	2.54	1.81	2.52
Core States Only	3.31	3.06	-0.44
Peripheral States Only	5.51	0.00	0.00
Control States Only	0.00	1.32	0.00

When the data from Table 6 is plotted (Figure 16), 1973 stands out again as a singular year with co-operation being relatively high in the survey group as a whole, within the postulated region and the two postulated sub-groups. 1973 is singular also in that it was the only year in which the inclusion of the two control factor states (Egypt and Italy) caused a greater level of co-operation within the survey group as a whole than among the five states of the postulated region alone. With the single exception of the two control states taken as a group, co-operation seems to have declined in 1974 and, while there was some improvement in co-operation for the postulated regional group in 1975, it remained at a low level for Mauritania and Libya (as a sub-group) and dropped to relative unco-operation for the postulated core states of Algeria, Morocco and Tunisia. While relatively co-operative foreign policy behavior for the postulated regional grouping throughout the period tends to suggest the possibility of a group of five states, there is no strong indication

FIGURE 16

FOREIGN POLICY EVENT AVERAGE LEVELS OF CO-OPERATION
TIME-SERIES PLOTS

here to either support or refute the Cantori and Spiegel model.

The Calhoun Tension Index was applied to yearly positive and negative events which occurred between each pair of states and a Tension-Disposition Matrix was constructed for each of the three years (Figures 17, 18 & 19). With these disposition scores as a basis, Cohesion, Esteem and Acceptance indexes were computed and the scores compared. A yearly breakdown of these factors for each of the groups of states is displayed in Tables 7 through 9 and a plot of cohesiveness for the various groupings was made (Figure 20). An analysis of the data contained in Tables 7 through 9 and Figure 20 yielded few clear trends beyond the indication that cohesion, esteem and acceptance among members of the postulated region were all generally reduced by the inclusion of the two control states (Egypt and Italy) into the grouping; this is generally supportive of the existence of a North African regional grouping during the three year survey period consisting of the five states postulated in the Cantori and Spiegel model. Cohesion, esteem and acceptance for the postulated region seemed very high in 1973, dipped considerably in 1974, and improved again in 1975, but not back to the 1973 levels. Taking a separate look at Cantori and Spiegel's postulated core and periphery states, we find some trends but little to either support or refute their model. Algeria,

FIGURE 17

FOREIGN POLICY TENSION-DISPOSITION MATRIX
1973

		<u>Recipient</u>						
		Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria		0.00	1.00	1.00	1.00		
	Morocco	.33		0.00	-.50	1.00		
	Tunisia	1.00	0.00		1.00	1.00		
	Libya	1.00	-1.00	1.00		1.00	0.00	
	Mauritania	1.00	1.00	1.00	1.00			
	Egypt				1.00			
	Italy							

FIGURE 18

FOREIGN POLICY TENSION-DISPOSITION MATRIX
1974

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	0.00	1.00	1.00	1.00		
	Morocco		0.00	-1.00	-1.00		
	Tunisia	1.00	1.00	0.00		1.00	
	Libya		1.00			-.50	0.00
	Mauritania	1.00	1.00				
	Egypt	1.00	1.00	-.43			1.00
	Italy					1.00	

FIGURE 19

FOREIGN POLICY TENSION-DISPOSITION MATRIX
1975

	<u>Recipient</u>						
	Algeria	Morocco	Tunisia	Libya	Mauritania	Egypt	Italy
<u>Actor</u>	Algeria	-1.00	1.00	1.00	1.00		
	Morocco	-1.00		1.00	1.00		
	Tunisia	1.00		.33			
	Libya	1.00	1.00			-1.00	
	Mauritania	1.00	.50	1.00		1.00	
	Egypt		1.00	-1.00			
	Italy						

TABLE 7
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1973

Survey Group

Cohesiveness of Survey Group = .329

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.500	.555
Morocco	.138	.000
Tunisia	.500	.500
Libya	.333	.583
Mauritania	.667	.667
Egypt	.167	.000
Italy	.000	.000

Postulated Region

Cohesiveness of total Region = .642

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.750	.833
Morocco	.208	.000
Tunisia	.750	.750
Libya	.500	.625
Mauritania	1.000	1.000

Postulated Core

Cohesiveness of total Core = .388

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.500	.665
Morocco	.165	.000
Tunisia	.500	.500

Postulated Periphery

Cohesiveness of Periphery = 1.000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Libya	1.000	1.000
Mauritania	1.000	1.000

TABLE 7 -- CONTINUED
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1973

Control Group

Cohesiveness of Control Group = .000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Egypt	.000	.000
Italy	.000	.000

TABLE 8
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1974

Survey Group

Cohesiveness of Survey Group = .264

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.500	.500
Morocco	-.333	.333
Tunisia	.500	.667
Libya	.083	-.072
Mauritania	.500	.000
Egypt	.428	.250
Italy	.167	.167

Postulated Region

Cohesiveness of total Region = .350

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.750	.500
Morocco	-.500	.500
Tunisia	.500	.750
Libya	.250	.000
Mauritania	.750	.000

Postulated Core

Cohesiveness of Core = .500

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.500	.500
Morocco	.000	.500
Tunisia	1.000	.500

Postulated Periphery

Cohesiveness of Periphery = .000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Libya	.000	.000
Mauritania	.000	.000

TABLE 8 -- CONTINUED
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1974

Control Group

Cohesiveness of Control Group = 1.000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Egypt	1.000	1.000
Italy	1.000	1.000

TABLE 9
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1975

Survey Group

Cohesiveness of Survey Group = .234

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.333	.333
Morocco	.167	.250
Tunisia	.217	.500
Libya	.333	.222
Mauritania	.583	.333
Egypt	.000	.000
Italy	.000	.000

Postulated Region

Cohesiveness of total Region = .492

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.500	.500
Morocco	.250	.125
Tunisia	.333	.750
Libya	.750	.583
Mauritania	.625	.500

Postulated Core

Cohesiveness of Core = .000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Algeria	.000	.000
Morocco	-.500	-.500
Tunisia	.500	.500

Postulated Periphery

Cohesiveness of Periphery = .000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Libya	.000	.000
Mauritania	.000	.000

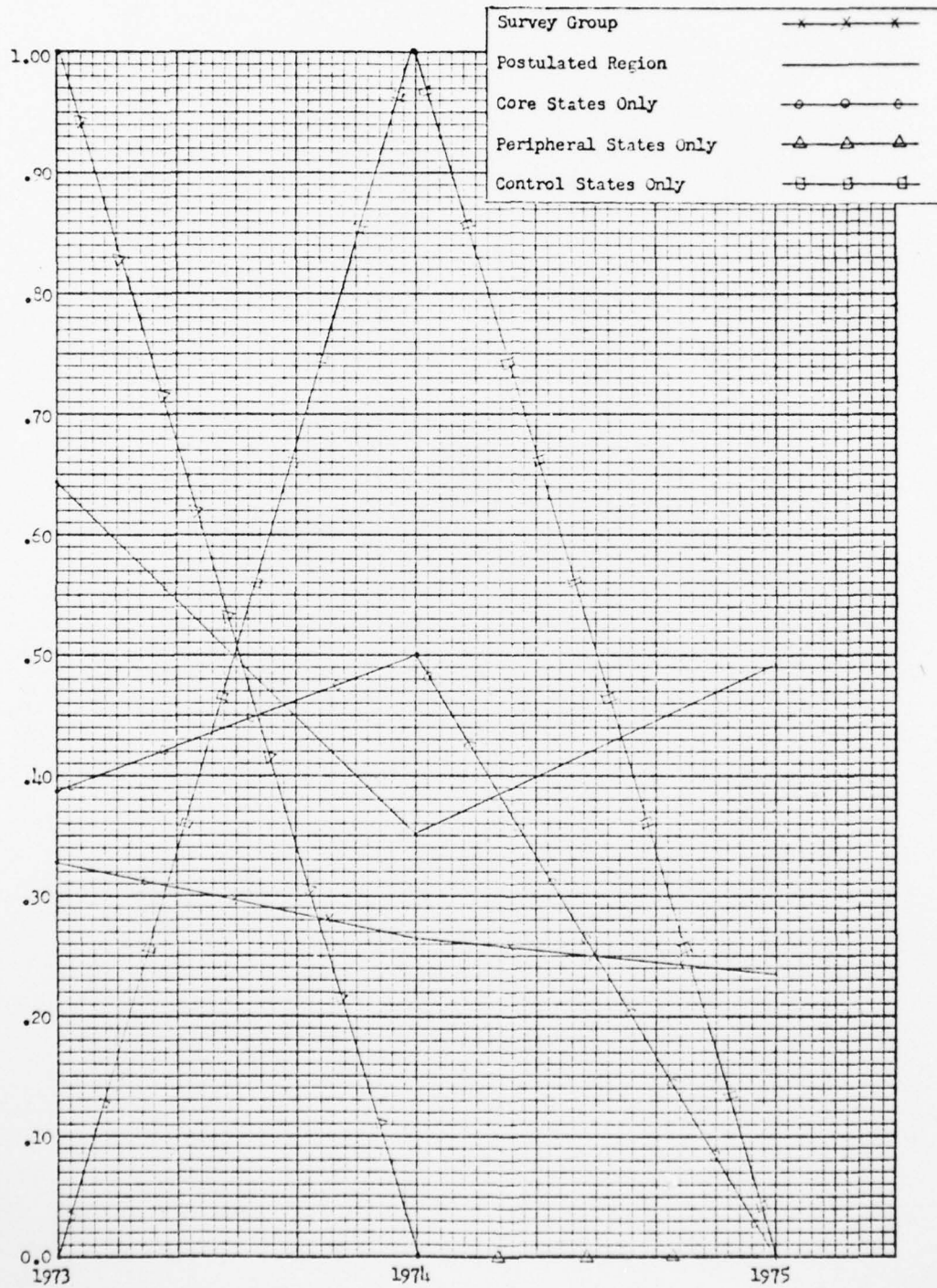
TABLE 9 -- CONTINUED
FOREIGN POLICY
COHESION - ESTEEM - ACCEPTANCE
1975

Control Group

Cohesiveness of Control Group = .000

<u>State</u>	<u>Esteem</u>	<u>Acceptance</u>
Egypt	.000	.000
Italy	.000	.000

FIGURE 20
COHESION
TIME-SERIES PLOTS



Morocco and Tunisia seemed to experience fairly constant cohesion, esteem and acceptance within their sub-group in 1973 and 1974, but in 1975, all three of these indicators dropped off rather sharply with the cohesion of the group reaching a neutral 0.00. Libya and Mauritania, as a sub-group, seemed to enjoy extremely high levels of cohesion, esteem and acceptance in 1973 with these dropping off to neutral 0.00's in 1974 and remaining there throughout 1975.

In reviewing the findings of both our aggregate and time-series analyses of foreign policy relationships, we have nothing that clearly supports or refutes the deductive model. If we limit our comment to foreign policy interactions during the period 1973-1975 covered by our data, we can say with some caution that for the group of five states comprising the postulated North African region, our limited data sampling did seem to indicate a positive relationship in terms of foreign policy event interaction, and that this relationship seemed strongest in 1973, slumped in 1974 and recovered somewhat in 1975. These findings were further supported by the apparent weakness of foreign policy event interaction displayed by Egypt and Italy (our two control factor states) during the same period. Beyond this, our foreign policy test gave meager indications about the further existence of core and periphery sub-groupings within the region. With our foreign policy analysis completed, let us now continue our empirical

testing of the Cantori and Spiegel model by conducting an analysis of trade relationships among the members of the same survey group.

CHAPTER IV

TRADE RELATIONSHIPS ANALYSIS

AGGREGATE AND TIME SERIES

In their book, The International Politics of Regions, Cantori and Spiegel postulate that

the minimal conditions for the existence of a core sector can be determined by its level of cohesion, which requires a consideration of the degree of social, economic, and political similarity, complementarity, and interaction within the particular group of states.⁷⁷

They go on to suggest that "while the core sector tends toward cultural, social and political homogeneity, the peripheral sector is characteristically heterogeneous, and there is usually little interaction among periphery members."⁷⁸ We would generally expect then, that in contrast to a high degree of cohesion among the core states of a subordinate system, the peripheral states of that same system would be characterized by less cohesion.⁷⁹ In terms of the foreign policy relationship findings just reviewed, our test could not support this aspect of the Cantori and Spiegel model. We have found instead a fairly high level of foreign policy cohesion among all five members of the postulated region (including both core and peripheral states). This suggests the possibility of a

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THE STRUCTURE OF FOREIGN POLICY AND TRADE RELATIONSHIPS WITHIN --ETC(U)
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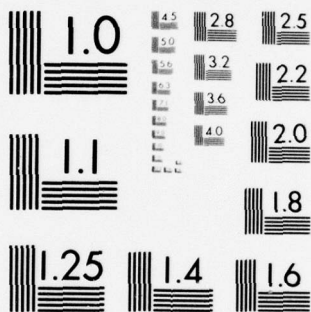
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

regional grouping, but offers little evidence of core and peripheral sub-groupings.

In apparent anticipation of such cases, Cantori and Spiegel further postulated that where both the core and periphery are cohesive, boundaries separating the sub-groups can be defined by the relative degree of cohesion which they display.⁸⁰ But even when we search for indications of relative degree, our foreign policy relationship test offers scant evidence of core and peripheral sub-groupings. In light of these findings, it seems important that we remain alert to the possibility of both broad economic patterns and more subtle degrees of economic interaction as we begin our trade relationships analysis.

Cantori and Spiegel have stated that economic cohesiveness can be measured in part by assessing ". . . the patterns and the degree of trade within the core and with the periphery."⁸¹ In conducting our trade relationship analysis, we will use a variety of techniques to examine the same seven state survey group (the postulated regional members plus two controls) as we did in the foreign policy portion of our test. Again, as we did in the foreign policy test, we will conduct our trade analysis in both an aggregate and a time-series mode. By drawing data from a broader time span (1967-1975), we hope to enhance the sensitivity of our trade analysis to subtle trends and patterns which might not be discernible over shorter periods.

TABLE 10

TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1967
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Trade With Survey Group Column 8-9
MOROCCO											
Exports		4802	749	591		301	16944	6142	23387	424089	1.45%
Imports		8003	350	546		331	22122	8899	31352	517754	1.72%
Balance		-3201	+399	+45		-30	-5178	-2757	-7965	-93665	
ALGERIA											
Exports	7275		1001	364	6	3938	35533	8656	48117	723647	1.19%
Imports	5282		1358	385		3101	20775	7025	30901	639060	1.10%
Balance	+1993		-357	-21	+6	+837	+14758	+1621	+17216	+84387	
TUNISIA											
Exports	216	1252		8932		2	19960	10400	30362	149278	6.97%
Imports	952	1101		782		32	18820	2835	21687	261152	1.09%
Balance	-736	+151		+8150		-30	+1140	+7565	+8675	-111874	
LIBYA											
Exports	496	350	711			250	238950	1557	240757	1178085	0.13%
Imports	650	400	9821			1812	162884	10741	175437	476407	2.25%
Balance	-154	-50	-8980			-1562	+76066	-9184	+65320	+701678	
MAURITANIA											
Exports							12807		12807	72023	0.00%
Imports							1087	6	1093	36886	0.02%
Balance							+11720	-6	+11714	+35137	
EGYPT											
Exports	301	2546	25	1647			21765	4519	26284	566117	0.80%
Imports	334	5173	5	373			31627	5885	43512	792036	0.74%
Balance	-33	-2627	+20	+1274			-15862	-1366	-17228	-225919	
ITALY											
Exports	20111	19636	17109	148076	979	34206		205911	240117	8701684	2.37%
Imports	20957	39481	23395	262845	14088	29845		360766	390611	9697022	3.72%
Balance	-846	-19845	-6286	-114769	-11109	+4361		-154855	-150494	-995338	

TABLE 11

TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1968
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8:10	Trade With Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		5830	591	2414		188	26470	8835	35493	450151	1.96%	24.90%
Imports		9293	287			1379	33329	9580	44288	551309	1.74%	21.63%
Balance		-3463	+304	+2414		-1191	-6859	-745	-8795	-101158		
ALGERIA												
Exports	8151		688	721	5	7149	46857	9565	63571	830200	1.15%	15.05%
Imports	6365		3478	204		7498	51978	10947	62523	814991	1.23%	14.45%
Balance	+1786		-2790	+517	+5	-349	-5121	-482	-5952	+15209		
TUNISIA												
Exports	254	3162		12295		2	16872	15711	32585	149278	10.52%	48.22%
Imports	608	757		146		25	26062	1511	27598	261152	0.58%	5.48%
Balance	-354	+2405		+12149		-23	-9190	+14200	-4987	-111874		
LIBYA												
Exports		195	133			1027	370685	328	372040	1875566	0.02%	0.09%
Imports	2655	793	12307			5356	193702	15755	214813	644609	2.44%	7.33%
Balance	-2655	-598	-12174			-4329	+176983	-15427	+157227	+1230957		
MAURITANIA												
Exports							10066		10066	22073	0.00%	0.00%
Imports		5					174	5	179	36886	0.01%	2.80%
Balance		-5					+9892	-3	+9887	+35137		
EGYPT												
Exports	1254	6748	23	4869			37181	12894	50075	621678	2.07%	25.75%
Imports	209	7864	2	1141			38691	9216	47707	666009	1.38%	19.32%
Balance	+1045	-1116	+21	+3728			-1310	+3678	+2368	-44331		
ITALY												
Exports	30299	47253	23693	176093	158	34992		277496	312488	10183247	2.73%	88.80%
Imports	2917	42172	27646	407553	11072	41312		517760	559072	9782680	5.29%	92.21%
Balance	+1182	+81	+1047	-231660	-10914	-6320		-240264	-240264	+400587		

TABLE 12
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1969
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8:10	Trade With Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		13940	1080	1021	36	151	39585	16077	53813	485198	3.31%	28.81%
Imports		12615	579	3	22	309	36300	13219	49828	562054	2.35%	26.53%
Balance		+1325	+501	+1018	+14	-158	+3285	+2858	+5985	-76856		
ALGERIA												
Exports	11259		1227	505	387	3000	32547	13378	48925	934335	1.43%	27.36%
Imports	15334		6863	102	5	6528	84339	22304	113771	1009170	2.21%	19.60%
Balance	-4075		-5636	+403	+382	-3528	-52392	-8976	-64846	-74835		
TUNISIA												
Exports	578	6177		12119		11	22375	18874	41260	165657	11.40%	45.74%
Imports	1428	1363		2536		369	30360	5177	36056	256339	2.08%	14.77%
Balance	-850	+4814		+9583		-358	-7385	+11567	+5204	-90682		
LIBYA												
Exports	3	93	2305			199	501915	2601	504515	2167034	0.11%	0.48%
Imports	1123	641	13330			3739	179284	15094	198617	675644	2.23%	7.60%
Balance	-1120	-548	-11025			-3540	+322131	-12693	+303898	+1491390		
MAURITANIA												
Exports	20	5				6	10316	25	10347	77134	0.03%	0.24%
Imports	40	430				938	1100	470	2508	44360	1.06%	18.74%
Balance	-20	-425				-932	+9216	-445	+7839	+32774		
EGYPT												
Exports	281	6376	336	3399	853		46372	11245	57617	745039	1.51%	19.52%
Imports	168	4000	12	221	7		47652	4408	52060	637716	0.69%	8.47%
Balance	+113	+2376	+324	+1178	+846		-1280	+6837	+5557	+107323		
ITALY												
Exports	33000	75400	27600	163440	1000	43320		206640	333960	11729280	2.48%	87.03%
Imports	43545	37351	28328	532107	12546	51523		670077	721602	12496732	5.38%	92.86%
Balance	-20345	+42049	-728	-368667	-11546	-8205		-379437	-387542	-746752		

TABLE 13
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1970
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8-10	Trade With Postulated Region as % of Trade With Survey Group Column 8-9
MOROCCO												
Exports		12994	763	3782	438	602	37980	17977	56566	487599	3.68%	31.78%
Imports		14655	1451	209		1308	41579	16315	59402	685916	2.38%	27.47%
Balance		-1661	-688	+3573	+438	-899	-3599	+1662	-2836	-197917		
ALGERIA												
Exports	13323		1777	965	18	2816	42493	16083	61392	1006747	1.60%	26.20%
Imports	14293		15998	484	44	4694	102958	30819	138471	1257101	2.45%	22.26%
Balance	-970		-14221	+481	-26	-1378	-60465	-14736	-77079	-250354		
TUNISIA												
Exports	1319	14398		16903		296	37683	32620	70599	182508	17.87%	46.20%
Imports	859	1974		138		520	28456	2971	31947	305555	0.97%	9.30%
Balance	+460	+12424		+16765		-224	+9227	+29649	+38652	-123047		
LIBYA												
Exports	190	460	125			263	611961	755	612979	2365647	0.00%	0.12%
Imports	4160	1061	18593			4664	166952	23814	15230	554405	4.30%	13.59%
Balance	-3970	-621	-18468			-4201	+465009	-23059	+437749	+1811242		
MAURITANIA												
Exports		40				2	12986	40	13028	90110	0.04%	0.31%
Imports	482	20				1389	1110	502	3001	55102	0.91%	16.73%
Balance	-482	+20				-1387	+11876	-462	+10027	+35008		
EGYPT												
Exports	1371	4267	472	4411	1263		48150	11784	59934	761711	1.55%	19.66%
Imports	670	3098	326	289	2		71225	4385	75610	786634	0.36%	5.80%
Balance	+701	+1169	+146	+4122	+1261		-23075	+7399	-15676	-24923		
ITALY												
Exports	2799	93598	25869	133593	1009	64750		291868	356618	13209832	2.21%	81.84%
Imports	47200	46100	42700	673157	13600	53500		817757	871257	14939160	5.47%	93.86%
Balance	-4401	+47498	-16831	-539364	-12591	+11250		-525889	-514639	-7729328		

TABLE 14
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1971
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade with Postulated Region as % of Total World Trade Column 8:10	Trade with Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		16375	1583	1318	1796	2040	23581	21072	46693	501152	4.20%	45.13%
Imports		13765	1441	155	1238	48009	48009	15361	66608	697264	2.20%	23.78%
Balance		+2610	+142	+1163	+1796	+802	-24428	+5711	-17915	-196112		
ALGERIA												
Exports	12174		730	607		3253	64260	13511	81024	852452	1.58%	16.68%
Imports	18013		6731	2472		3042	104410	27241	134693	1221245	2.23%	20.22%
Balance	-5839		-6021	-1870		+211	-40150	-13730	-53689	-368703		
TUNISIA												
Exports	1305	6076		21359		143	42188	28740	71071	215843	13.32%	40.44%
Imports	1741	803		428		362	37052	2972	40386	342901	0.87%	7.36%
Balance	-436	+5273		+20931		-219	+5136	+25768	+30685	-127058		
LIBYA												
Exports	141	2252	389			7456	647718	2782	657954	2695010	0.10%	0.42%
Imports	1317	674	23095			8460	193023	25106	225589	635971	3.61%	11.08%
Balance	-1196	+1578	-22706			-1006	+454695	-22324	+431365	+1999039		
MAURITANIA												
Exports							10375		10375	90488	0.00%	0.00%
Imports	1975					770	641	1975	3386	56822	3.48%	58.33%
Balance	-1975					-770	+9734	-1975	+6989	+33666		
EGYPT												
Exports	1125	2841	329	7691	700		43416	12686	56102	789215	1.6%	22.61%
Imports	2244	3578	159	8282			59246	14263	73509	919780	1.55%	19.40%
Balance	-1119	-737	+170	-591	+700		-15830	-1577	-17407	-130465		
ITALY												
Exports	43645	103909	23684	175475	542	53860		357255	411115	15122653	2.36%	86.90%
Imports	27240	71640	48200	712490	13000	48240		870570	918810	15980520	5.45%	94.75%
Balance	+16405	+32269	-12516	-537015	-12458	+5620		-513315	-507695	-857867		

TABLE 15
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1972
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8-10	Trade With Postulated Region as % of Trade With Survey Group Column 8-9
MOROCCO												
Exports		21125	3903	574	456	1494	56868	26058	84420	633681	4.11%	30.87%
Imports		19157	1621	45	45	2022	42891	20823	62736	767118	2.71%	31.68%
Balance		+1968	+2282	+574	+411	-528	+13977	+5235	+18684	-133437		
ALGERIA												
Exports	17480		660	230	90	5470	99010	18960	123440	1287400	1.47%	15.36%
Imports	23238		8910	22	170	17535	17535	32170	207625	1471920	2.19%	15.49%
Balance	-5758		-8250	+708	-490	-45300	-76325	-13210	-86235	-184520		
TUNISIA												
Exports	1521	8020		15740		952	92049	25281	118282	310590	8.14%	21.37%
Imports	4290	726		732		528	57526	5748	63902	459129	1.25%	9.00%
Balance	-2769	+7294		+15008		+424	+34623	+19533	+54380	-148539		
LIBYA												
Exports		20	666			552	585856	686	587094	2937535	0.00%	0.12%
Imports	631	813	16410		32	16148	341425	17886	375453	1043351	1.71%	4.76%
Balance	-631	-793	-15744		-32	-15596	+244431	-17200	+211635	+1894224		
MAURITANIA												
Exports	40			30			14177	70	14247	106860	0.07%	0.49%
Imports	510	100					1100	610	1710	70960	0.86%	35.67%
Balance	-470	-100		+30			+13077	-540	+12537	+35900		
EGYPT												
Exports	1820	150	480	14680			42336	17130	59466	855210	2.08%	28.81%
Imports	1640	6010	1047	890			49562	9587	59149	888820	1.08%	16.21%
Balance	+180	-5860	-567	+13790			-7226	+7543	+317	-63610		
ITALY												
Exports	41300	15395	52432	310386	958	45056		564471	609527	18576730	1.05%	92.61%
Imports	58400	108911	100910	64442	16340	47040		930003	977043	19288640	4.83%	95.19%
Balance	-18100	+50484	-48478	-334036	-15382	-1984		-365532	-367516	-731910		

TABLE 16
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1973
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8:10	Trade With Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		27900	5630	700	400	790	60720	34630	96190	873960	1.96%	36.00%
Imports		25470	1860	22	230	140	64480	27582	92202	1037320	2.51%	29.91%
Balance		+2430	+1770	+678	+170	+650	-3710	+7048	+3988	-223360		
ALGERIA												
Exports	24500		850	325	140	1820	171170	25815	198805	1796760	1.44%	12.99%
Imports	31160		11980	160	1350	7230	195710	44650	247590	2132360	2.09%	18.03%
Balance	-6660		-11130	+165	-1210	-5410	-24540	-18835	-48785	-315600		
TUNISIA												
Exports	1752	10782		20419		1562	60977	32953	95492	384318	8.57%	35.51%
Imports	6190	935		370		1200	59310	7495	98095	606218	1.24%	11.02%
Balance	-4438	+9847		+20049		+362	+1667	+25458	+27487	-221900		
LIBYA												
Exports	20	140	340		66	46390	1120700	500	1167590	3996170	0.01%	0.04%
Imports	710	325	22460		24343	23621	499167	23621	547331	1722780	1.37%	4.32%
Balance	-790	-185	-22120		-66	+22047	+621333	-23121	+620259	+2273390		
MAURITANIA												
Exports	210	1300		60			15036	1570	16606	153770	1.02%	9.45%
Imports	470	170					2268	590	2858	115670	0.51%	20.64%
Balance	-260	+130		+60			+12768	+980	+13748	+38100		
EGYPT												
Exports	120	6570	1090	22130			51040	29310	80950	1124660	2.66%	36.95%
Imports	870	2002	1718	51029			52900	55619	108519	908310	6.12%	51.25%
Balance	-750	+4568	-628	-28899			-1860	-25709	-27569	+216130		
ITALY												
Exports	58614	177921	53915	453970	2006	54289	746426	746426	800715	22261457	3.35%	93.22%
Imports	67694	188287	67070	1232770	16642	54654	1572463	1572463	1627117	27865501	5.65%	96.64%
Balance	-9080	-10366	-13155	-778800	-14636	-365	-826037	-826037	-826402	-5584044		

TABLE 17
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1974
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8:10	Trade With Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		32770	13200	910	610	1700	126800	5490	182000	1584520	3.44%	29.78%
Imports		49990	2000	1800	30	220	90795	53820	144835	1738380	3.10%	37.16%
Balance		-10220	+11200	-890	+580	+1480	+36005	+670	+38155	-153860		
ALGERIA												
Exports	44990		5300	300	400	2300	244200	50990	297490	6537400	1.12%	17.14%
Imports	43750		18900	420	2100	17000	352100	65170	439270	4405400	1.48%	14.84%
Balance	+1240		-13600	-120	-1700	-14700	-112900	-14180	-141780	+112000		
TUNISIA												
Exports	17390	17280		32100	3210	158750	158750	56170	218130	926000	6.07%	25.75%
Imports	14530	5840		3540	2250	128560	128560	23200	154710	1135740	2.10%	15.45%
Balance	-12730	+11440		+33560	+260	+30190	+30190	+32270	+63420	-209740		
LIBYA												
Exports	1600	380	3100			1332	2128900	5170	2136402	8260800	0.06%	0.24%
Imports	1000	400	48800		100	27370	940700	50300	1018570	2762800	1.82%	4.94%
Balance	+600	-20	-45610		-100	-26238	+1189200	-45130	+1117832	+5498000		
MAURITANIA												
Exports	33	1950		90		18120	18120	2073	20123	181330	1.14%	10.27%
Imports	650	470				2040	2040	1120	3160	120710	0.93%	35.44%
Balance	-617	+1480		+90		+16080	+16080	+953	+17033	+60620		
EGYPT												
Exports	180	15440	2025	24920		75360	75360	42615	117975	1517150	2.81%	36.12%
Imports	1870	2490	3530	1480		203680	203680	9360	213040	2351500	0.40%	4.39%
Balance	-1690	+12960	-1505	+23490		-128320	-128320	+33255	-95065	-834350		
ITALY												
Exports	82541	326192	116872	855198	1876	185163	1382679	1382679	1567842	30299799	4.56%	88.19%
Imports	151712	268430	176390	2366369	19963	83727	2987064	2987064	3066791	40711821	7.33%	97.27%
Balance	-69171	+57762	-59518	-1511371	-18087	+101436	-1600385	-1600385	-1438949	-10412022		

TABLE 18
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1975
1000 U.S. DOLLARS

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY	Trade With Postulated Region Sum of Columns 1-5	Trade With Survey Group Sum of Columns 1-7	Total World Trade	Trade With Postulated Region as % of Total World Trade Column 8:10	Trade With Postulated Region as % of Trade With Survey Group Column 8:9
MOROCCO												
Exports		37600	8000	2650	900	2720	129000	44150	175870	1542710	2.86%	25.10%
Imports		11900	670	280	33	440	118700	12883	132023	2567410	0.50%	9.76%
Balance		+20700	+7330	+2370	+867	+2280	+10300	+31267	+43847	-1014700		
ALGERIA												
Exports	10800		2600	300	400	2000	265900	14100	383000	6438000	0.32%	3.68%
Imports	35900		39800		3200	25500	610800	78900	715200	6383200	1.24%	11.03%
Balance	-25100		-37200	+300	-2800	-23500	-243900	-64800	-332200	-1945200		
TUNISIA												
Exports	610	36210		47310		510	144440	84130	229080	857520	9.81%	36.73%
Imports	8910	2890		250		2640	133620	12050	158310	1421150	0.85%	8.12%
Balance	-8300	+33330		+47060		-2130	+10820	+72080	+80770	-564230		
LIBYA												
Exports	250		225			5000	1159200	475	1164675	5706900	0.01%	0.04%
Imports	2900	330	45500		140	49170	1029200	48820	1172240	4394500	1.11%	4.15%
Balance	-2650	-330	-45275		-140	-44170	+79500	-48395	-13065	+1307400		
MAURITANIA												
Exports	30	2920		130			28690	3080	31270	189000	1.63%	9.69%
Imports	950	420					2200	1370	3570	222000	0.62%	38.38%
Balance	-920	+2500		+130			+26490	+1710	+28200	-53000		
EGYPT												
Exports	400	23200	2400	44700			148500	70700	219300	1401900	5.40%	12.24%
Imports	3000	2200	600	5500			418500	11300	429800	3250400	0.30%	2.63%
Balance	-2600	+21000	+1800	+19200			-269900	+59400	-210500	-2348500		
ITALY												
Exports	107880	555240	125640	1038600	2000	380520		1829360	2209880	34829760	5.25%	82.78%
Imports	143520	403560	136200	1239240	37000	163440		1934520	2117360	28303800	5.09%	92.18%
Balance	-35640	+151680	-10560	-200640	-30000	+217080		-125160	+93420	-3513880		

TABLE 18 -- CONTINUED
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1967-1975
NOTES

Values are expressed in thousands of U.S. dollars and relate to declared transaction values.

All export figures: f.o.b. (Free on Board).

All import figures: c.i.f. (Cost, Insurance and Freight).

Where import figures were found to be smaller than export figures between state dyads for any given year, the import figure was assumed to be incomplete and a new figure was computed. Applying a +10% factor used by the International Monetary Fund for estimating insurance and freight costs, adjusted import figures were calculated.^A

Where import figures were found to be significantly higher than export figures between state dyads for any given year, the export figure was assumed to be incomplete and a new figure was computed. The derived export was arrived at by applying a -10% factor to the import figure as an approximation of export f.o.b. values.

In those cases where an export figure was reported from one state to another, but no import figure was reported for the same period, or vice versa, figures were derived from the existing data by applying the appropriate + or - 10% factor cited above.

In those cases where no import nor export figures were reported between state dyads for any given year, it was assumed that trade was negligible or that none took place. Such cases account for those sections of the tables which are blank.

Figures in Column 12 for the five members of the postulated Region (Morocco, Algeria, Tunisia, Libya and Mauritania) are based on intra-regional trade only and do not include trade between members of the postulated Region and Egypt or Italy. Figures in Column 12 for Egypt and Italy are based also on trade with the five members of the postulated region only and do not include trade with the other control state, (i.e., Egypt with Italy or Italy with Egypt).

^A International Monetary Fund, International Bank for Reconstruction and Development, Direction of Trade Annual 1969-75 (Washington, D.C.: Bureau of Statistics, IMF, 1976), p. ii.

TABLE 18 -- CONTINUED
TRADE AMONG THE COUNTRIES OF THE SURVEYED GROUP
1967 - 1975
NOTES -- CONTINUED

Figures and calculations on data taken from the following sources:

International Monetary Fund, International Bank For Reconstruction and Development, Direction of Trade (Washington, D.C.: Bureau of Statistics, IMF), January 1975 - May 1977.

International Monetary Fund, International Bank For Reconstruction and Development, Direction of Trade Annual 1969-73 (Washington, D.C.: Bureau of Statistics, IMF).

International Monetary Fund, International Bank For Reconstruction and Development, Direction of Trade Annual 1969-75 (Washington, D.C.: Bureau of Statistics, IMF).

International Monetary Fund, International Bank For Reconstruction and Development, Direction of Trade Annual 1970-74 (Washington, D.C.: Bureau of Statistics, IMF).

Organization For Economic Co-operation and Development, Overall Trade by Countries (Paris: O.E.C.D.), Series A, January 1968 - December 1976.

Organization For Economic Co-operation and Development, Commodity Trade: Imports (Paris: O.E.C.D.), Series C, January-December 1967 through January-December 1974.

Organization For Economic Co-operation and Development, Commodity Trade: Exports (Paris: O.E.C.D.), Series C, January-December 1967 through January-December 1975.

United Nations, Economic Commission For Africa, Foreign Trade Statistics For Africa (New York: U.N.), Series A, Direction of Trade, E/CN.14/STAT/SER. A/#13-24.

The first step of our trade relationship analysis was to extract yearly export and import data for the states of the survey group from documents published by the International Monetary Fund, the Organization For Economic Cooperation and Development, and the United Nations Economic Commission For Africa.⁸² This information is displayed in matrix form, broken down by year, in columns 1 through 7 of Tables 10-18. Yearly total world trade figures for each member of the survey group were also extracted from these same documents and displayed in column 10 of Tables 10-18. Based on this data, the following calculations were made and also displayed by year in Tables 10-18:

The total value, by year, of exports and imports each country of the survey group had with the five members of the postulated region. This calculation, displayed in column 8, was made by summing the dyadic figures of columns 1 through 5 only.

The total value, by year, of exports and imports each country of the survey group had with all seven members of the survey group. This calculation, displayed in column 9, was made by summing the dyadic figures of columns 1 through 7.

The export and import trade of each country of the survey group with the five members of the postulated region as a yearly percentage of their total world trade. This calculation, displayed in column 11, was made by a

routine percentage operation with the summed figures of columns 8 and 10.

The export and import trade of each country in the survey group with the five members of the postulated region as a yearly percentage of their trade with all seven members of the survey group. This calculation, displayed in column 12, was made by a routine percentage operation with the summed figures of columns 8 and 9.

And finally, yearly trade balance figures (dyadic and summed) for each country of the survey group. This calculation, displayed in columns 1 through 10, is the algebraic difference between export figures (assigned a positive value) and import figures (assigned a negative value). Balance figures with a positive sign indicate that in that particular case, the value of exports exceeded that of imports; balance figures with a negative sign indicate that the value of imports exceeded that of exports.

Having thus organized this basic trade data for the seven members of our survey group for the period 1967-1975 and having made a few preliminary calculations, we moved on to a more detailed analysis of levels and patterns of trade.⁸³

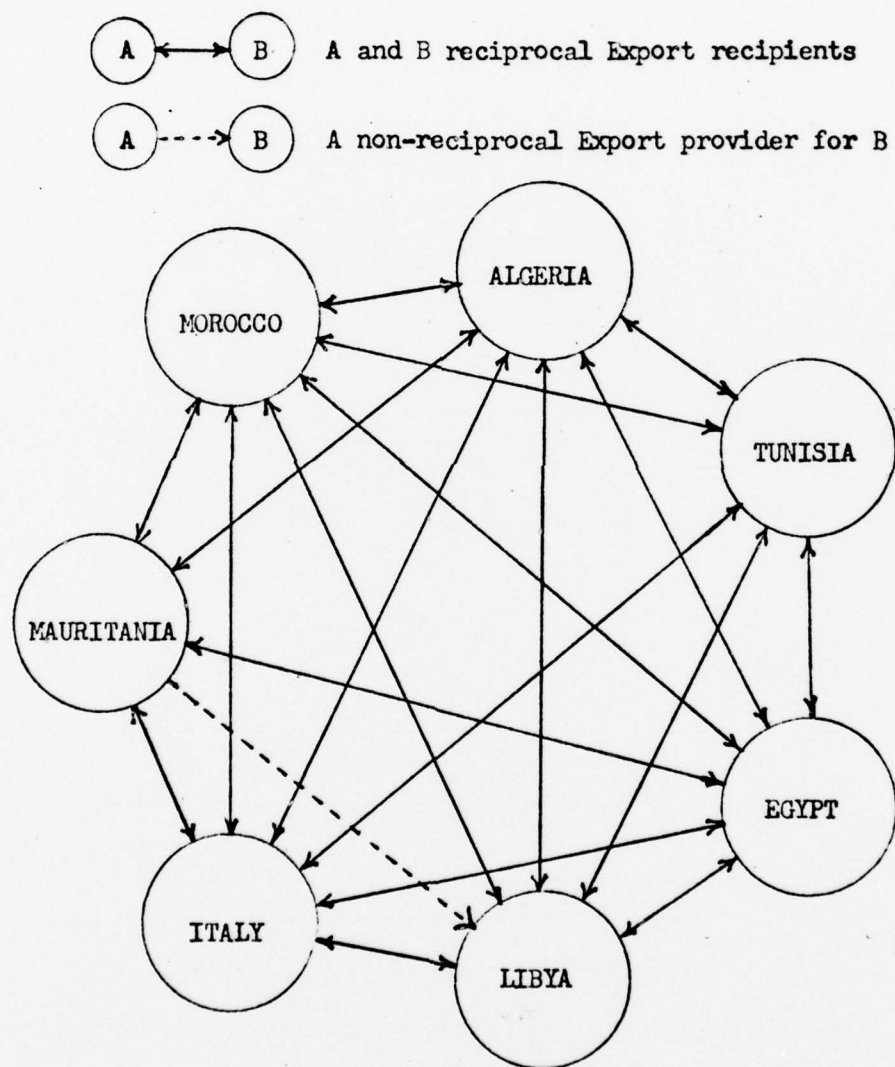
The first of these operations involves the use of the same linear graph theory techniques used in our foreign policy analysis. By examining the dyadic trade interactions of all members of the survey group (columns 1-7 of

Tables 10-18), a graphic representation of the aggregate interactive trade structure of the entire survey group for the years 1967-1975 was drawn (Figure 21). What we have in this graph is a very gross representation which does not address levels of trade but does indicate which countries were trading partners at some time during the nine year survey period.

While the graph is not complete, it is nearly so, indicating a generally high level of trade interaction and interdependence among all seven states. No state stands out as a nexus of interaction, there are no indications of separate groupings of states (sub-graphs) which tended to trade exclusively among themselves, and no states which were economically isolated from the rest of the group during the entire nine year survey period. There were, however, some weak interactive links. Tunisia and Mauritania did not trade with each other at all and the trade link between Libya and Mauritania was also weak, with Mauritania exporting to Libya but Libya not reciprocating. Thus, in terms of gross trade linkages during the 1967-1975 period, Mauritania would seem to be least integrated into the group, followed by Tunisia and then Libya; all other states enjoyed complete trade integration with their fellow group members.

In terms of the Cantori and Spiegel model, these findings seem mixed. Morocco, Algeria and Tunisia (the

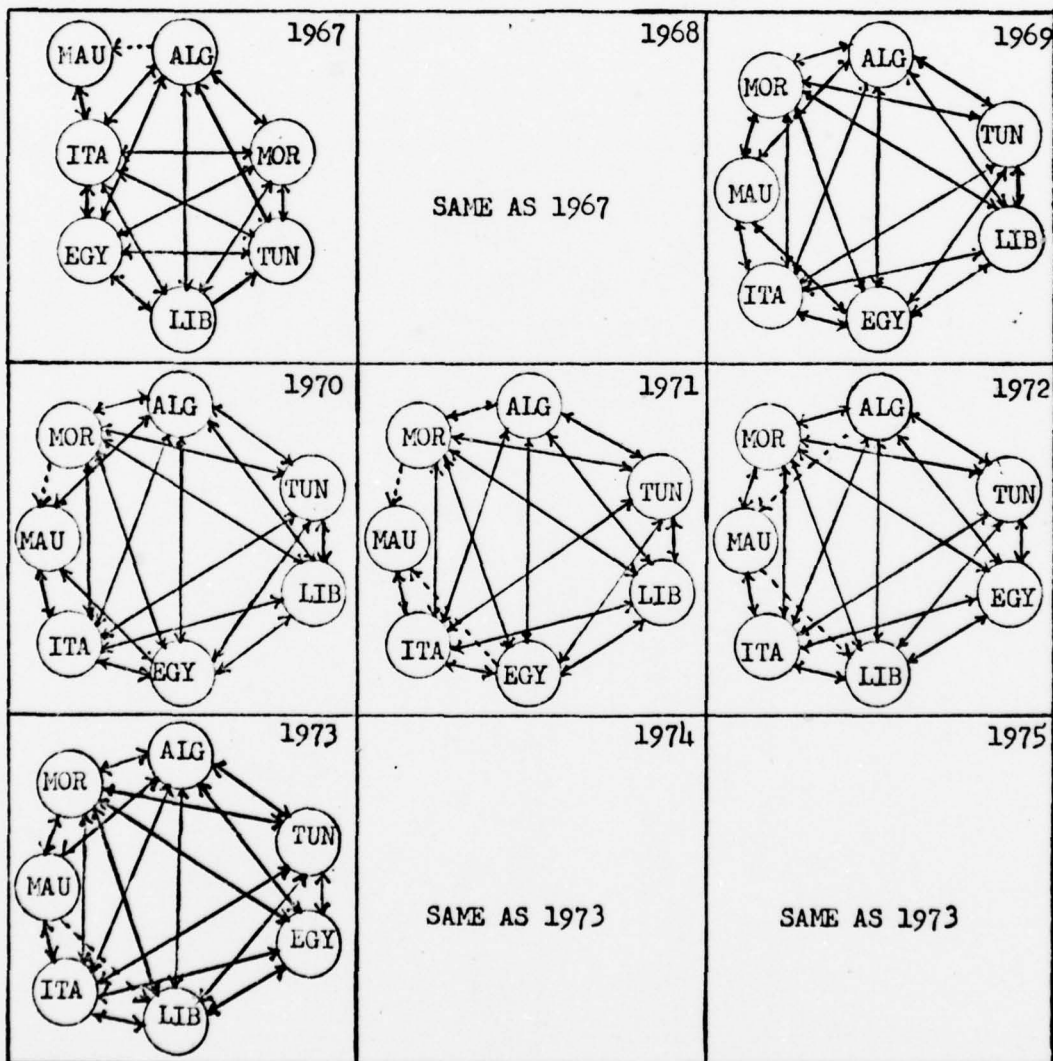
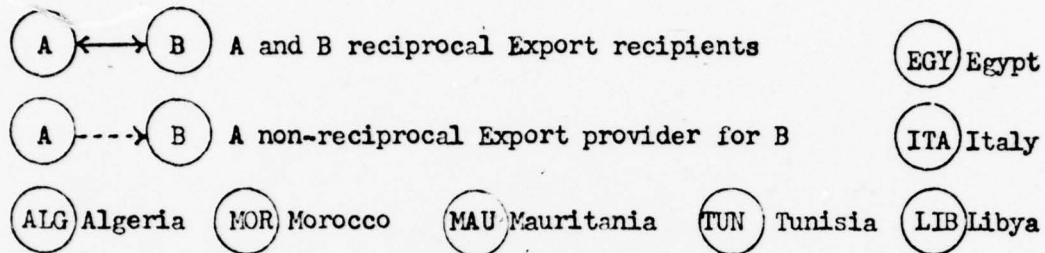
FIGURE 21
GROSS TRADE INTERACTIVE STRUCTURE
SURVEY GROUP
AGGREGATE 1967-1975



postulated core states) are completely linked with one another as would be expected if the model were accurate. They are also completely linked with Libya (a postulated peripheral state) and with both Egypt and Italy (the two control factor states). Thus, beyond the complete linkages among Morocco, Algeria and Tunisia, and the slightly weaker linkages of Mauritania and Libya, there is little here to suggest either separate regional grouping or the existence of core and peripheral sub-groups.

When we break the same gross linkage data down by year for a time-series analysis (Figure 22), we gain little more information beyond a fairly clear picture of Mauritania's waxing and waning trade integration. In 1967 and 1968, the first two years of our survey period, Mauritania had extremely weak trade linkages with the group as a whole; she had a reciprocal linkage with Italy and a nonreciprocal linkage with Algeria. From this extremely weak position, Mauritania jumped in 1969 to the strongest position she achieved in the entire nine year period investigated. In that year she enjoyed reciprocal trade exchanges with all group members except Tunisia and Libya. Her position slipped again in 1972 and in 1973, Mauritania settled into a pattern of reciprocal linkages with Morocco, Algeria and Italy which held throughout the remaining years of the survey period. This time-series analysis tends to emphasize the relatively weak trade ties

FIGURE 22
GROSS TRADE INTERACTIVE STRUCTURE
SURVEY GROUP
BY YEAR 1967-1975



which existed between Mauritania, the postulated region and the entire survey group during the period 1967-1975.

Up to this point, we have made only gross identifications of trade linkages among the states of the survey group; we have not yet begun to take into account the quality or strength of those linkages. A good means of assessing trade linkage strength is volume, which can be measured in dollar value. Turning to the data contained in columns 1 through 7 (Tables 10-18), and summing first the export and then the import dollar value figures by country dyad for the entire nine year survey period, we were able to make an aggregate identification of the primary trading partners within the survey group as a whole. These findings, reduced to matrix form, are displayed in Table 19. From the information contained in the matrix, a graphic representation of intra-group primary export and primary import trading partners for the aggregate period 1967-1975 was drawn (Figure 23).

The pattern which emerges in Figure 23 is a strongly rooted graph with Italy at the nexus of interaction.⁸⁴ In terms of aggregate trade, so strong is Italy's position within the survey group that she was the primary intra-group export provider and import recipient for each of the other six countries.⁸⁵ Within the group, Italy's own primary export recipient and import provider for the nine year aggregate period was Libya. Beyond the fact that all

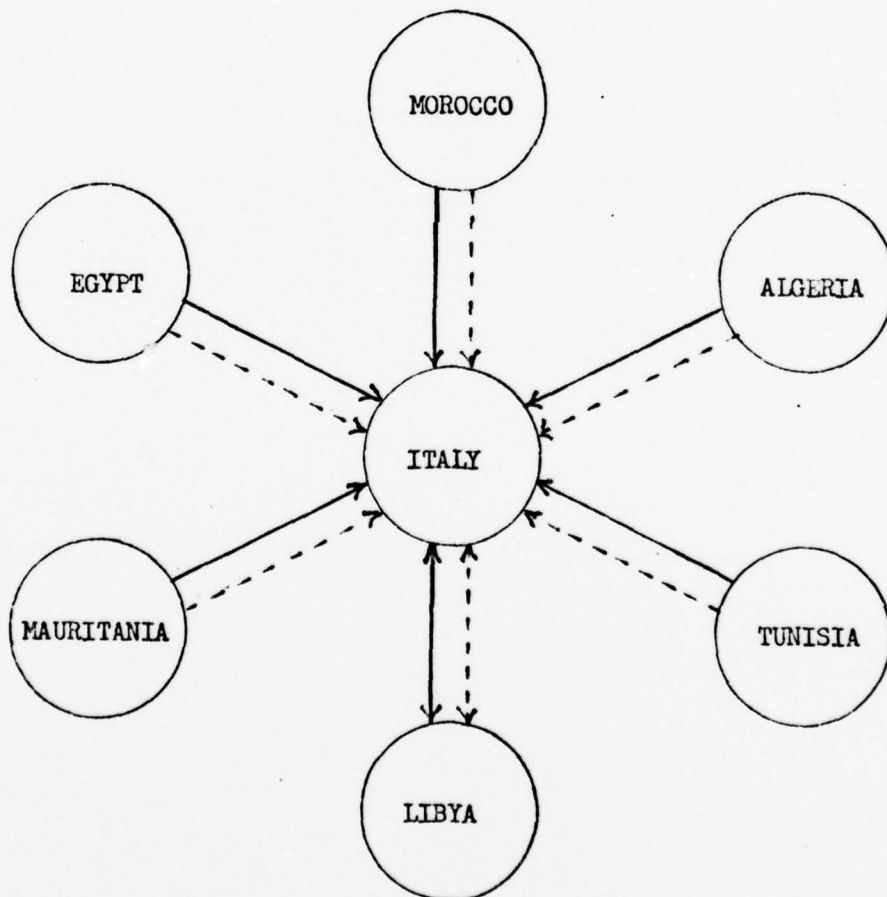
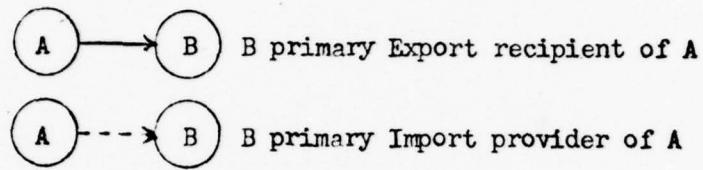
TABLE 19
 INTRA-GROUP PRIMARY EXPORT AND IMPORT TRADING PARTNERS
 SURVEY GROUP -- AGGREGATE
 IN TERMS OF TOTAL VALUE
 FOR THE ENTIRE PERIOD 1967-1975
 EXPORTS

	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY
MOROCCO							X
ALGERIA							X
TUNISIA							X
LIBYA							X
MAURITANIA							X
EGYPT							X
ITALY				X			

IMPORTS

	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT	ITALY
MOROCCO							X
ALGERIA							X
TUNISIA							X
LIBYA							X
MAURITANIA							X
EGYPT							X
ITALY				X			

FIGURE 23
INTRA-GROUP PRIMARY TRADING PARTNER INTERACTIVE STRUCTURE
SURVEY GROUP -- AGGREGATE
IN TERMS OF TOTAL VALUE
FOR THE ENTIRE PERIOD 1967-1975



five postulated members of the regional grouping shared a strong trade linkage with the same state, there is absolutely no pattern here which suggests the existence of either a regional grouping or core and peripheral sub-groupings.

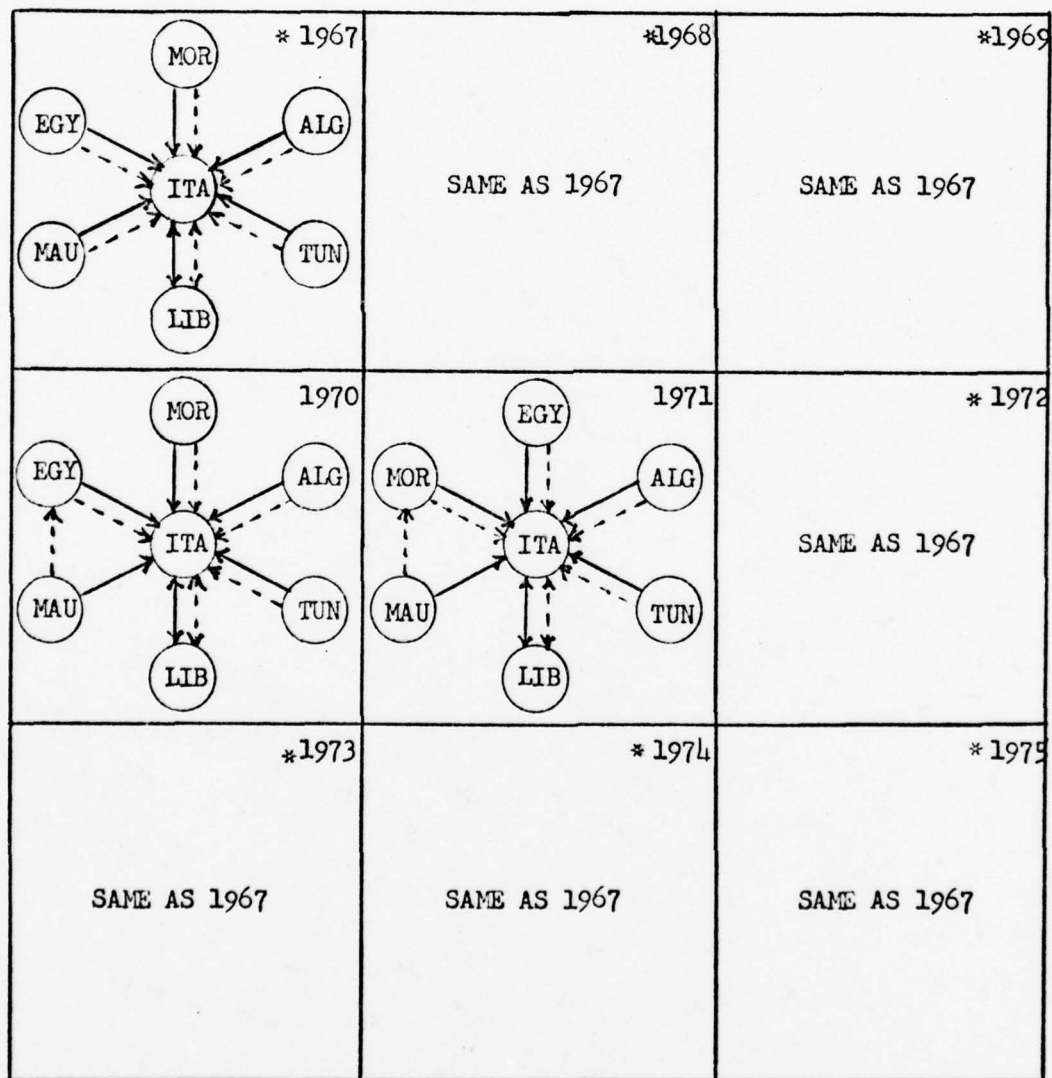
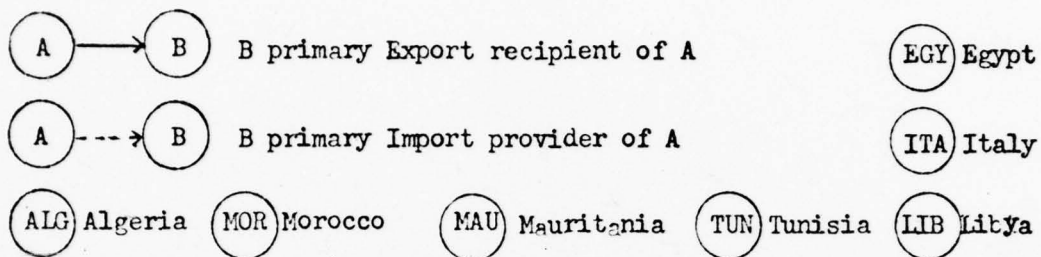
In an effort to determine what subtle variations in primary trading partners might have occurred over time, we broke the same data down by year for a time-series analysis. The year by year dyadic results are displayed in Table 20. From the information contained in tabular form, graphic representations of intra-group primary export and primary import trading partners were drawn for each of the nine years surveyed (Figure 24).

The uniformity of yearly patterns is striking. All nine graphs are rooted, with Italy in the dominant nexus position in every case. Deviations from the aggregate pattern occurred in only two years (1970 and 1971) and they were very slight. Both deviations involved Mauritania's primary import providing partners; in 1970, rather than Italy it was Egypt and in 1971, rather than Italy it was Morocco. Thus, there were few subtle variations in pattern to note in terms of time series intra-group primary trading partners. Those slight variations from the dominant pattern which were noted provided no additional support for the Cantori and Spiegel model. Indeed, these findings, if taken by themselves, would suggest that Italy

TABLE 20
INTRA-GROUP PRIMARY EXPORT AND IMPORT TRADING PARTNERS
SURVEY GROUP
BY COUNTRY/BY YEAR
1967-1975

[illegible]

FIGURE 24
 INTRA-GROUP PRIMARY TRADING PARTNER INTERACTIVE STRUCTURE
 SURVEY GROUP
 BY YEAR 1967-1975



* Same as 1967-1975 Aggregate Interactive Structure

(a non-member of the postulated region), was not only a member of the regional grouping, but held a key position in its core.

Italy's trade domination within the survey group is emphasized further when we examine the number of years each member country was a primary export recipient or import supplier for other countries in the group during the period 1967-1975 (Table 21). When we sum the export figures by country, we find that Italy was the primary intra-group export recipient for 54 country-years (the maximum possible for a state in our survey).⁸⁶ Libya was the only other country to score at all with a figure of 9 country-years, all of which were linked to Italy. In terms of imports supplied, Italy was again in a class alone, with 52 country-years. Libya again had 9 country-years, all linked to Italy. Here, Morocco and Egypt did show some strength with 1 country-year each, both linked to Mauritania.

As a means of rank ordering the seven states of the survey group in terms of their intra-group trade volume (measured in 1000's of U.S. dollars), the following calculations were made. Export and import figures from column 9 (Tables 10-18) were summed by country for the nine year period 1967-1975. These total intra-survey group export and import figures were then entered by country into Table 22. Total survey group export and import figures

TABLE 21
INTRA-GROUP PRIMARY TRADING PARTNER COUNTRY-YEARS
SURVEY GROUP
PERIOD 1967-1975

EXPORTS

Exporter	Number of Years Each Group Member was a Primary Export Recipient- By Country					
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT
MOROCCO						9
ALGERIA						9
TUNISIA						9
LIBYA						9
MAURITANIA						9
EGYPT						9
ITALY				9		
Total*	0	0	0	9	0	54

IMPORTS

Importer	Number of Years Each Group Member was a Primary Import Supplier - By Country					
	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA	EGYPT
MOROCCO						9
ALGERIA						9
TUNISIA						9
LIBYA						9
MAURITANIA	1					7
EGYPT					1	9
ITALY				9		
Total*	1	0	0	9	0	52

*Totals indicate the number of country-years each member country was the primary Export Recipient or Import Supplier for other members of the Survey Group during the nine year period 1967-1975.

were next calculated by summing the figures of each individual country. Based on this data, a percentage of intra-group export and import was calculated for each country and also entered into Table 22. Graphic representations of these findings are displayed in Figures 25 and 26.

In terms of export value ranking within the survey group, Libya ranked first, followed closely by Italy. Algeria, Tunisia, Morocco and Egypt all clustered together and Mauritania stood in a third category well below any other state in the group. In terms of import value ranking within the survey group, Italy was far above any other state, Libya followed next in a separate category but well below Italy, followed by Algeria, Egypt, Morocco and Tunisia again clumping generally together and Mauritania last again in a category well below any other state in the group. Beyond the clumping of the three postulated core states and the weak position of Mauritania, there is little evidence here to support the Cantori and Spiegel model.

Before moving on, it would seem appropriate to analyze the survey group trade pattern findings up to this point. Recall that Cantori and Spiegel postulated a five state region and that as an analytic device to help define and test the boundaries of that postulated region, we added two states (Egypt and Italy) to our survey group. If the Cantori and Spiegel model were accurate for the period of our survey, we would generally expect that states not

TABLE 22
COMPARATIVE COUNTRY SHARES
OF TOTAL INTRA-GROUP TRADE
FOR THE ENTIRE PERIOD 1967-1975

	PERIOD 1967 - 1975			
	Total Exports Within Survey Group By Country 1000 U.S. Dollars	Country % of Total Intra-Group Exports	Total Imports Within Survey Group By Country 1000 U.S. Dollars	Country % of Total Intra-Group Imports
MOROCCO	757422	4.18	684274	3.45
ALGERIA	1305764	7.20	2097094	10.56
TUNISIA	906861	5.00	592601	2.98
LIBYA	7444006	41.05	4109786	20.70
MAURITANIA	139439	.77	21465	.11
EGYPT	727703	4.01	1102906	5.55
ITALY	6851262	37.78	11250263	56.65
Total	18132457		19858389	

FIGURE 25
BY-COUNTRY INTRA-GROUP EXPORT SHARES
SURVEY GROUP
FOR THE ENTIRE PERIOD 1967-1975

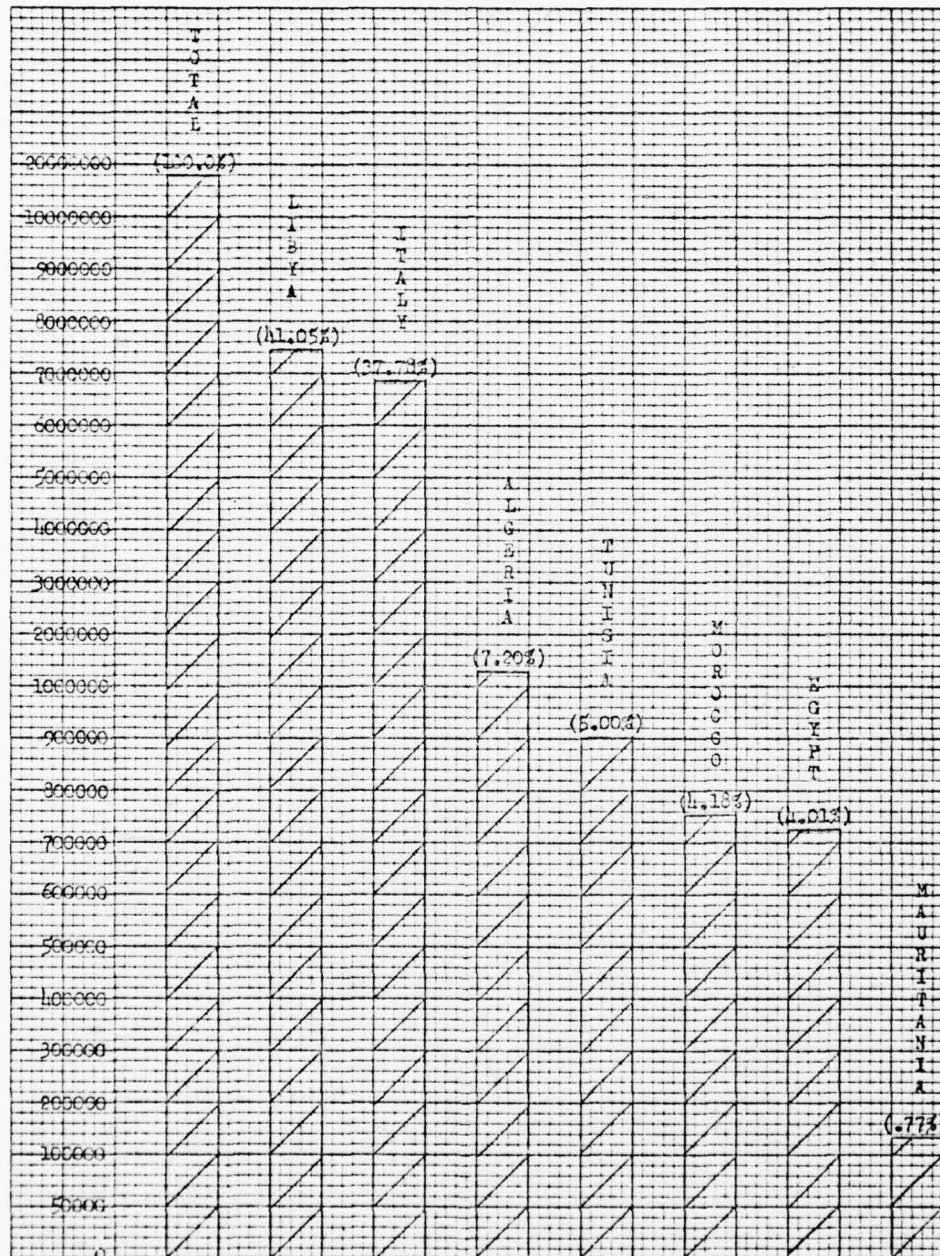
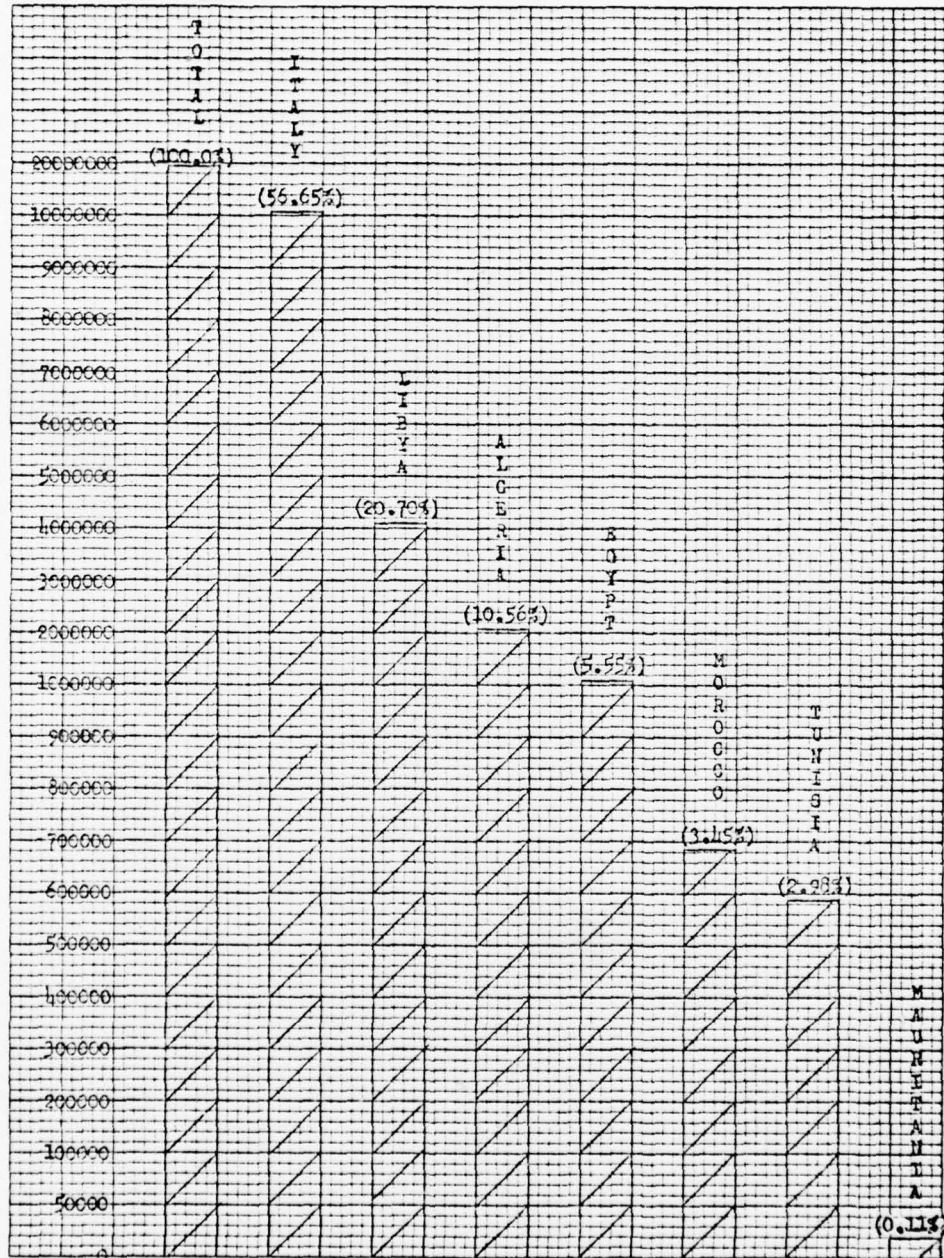


FIGURE 26
BY-COUNTRY INTRA-GROUP IMPORT SHARES
SURVEY GROUP
FOR THE ENTIRE PERIOD 1967-1975



included in the regional grouping nor even considered to be members of the intrusive system, would display a weaker pattern of linkage and interaction within the survey group than would states comprising the postulated region. In terms of trade patterns, however, contrary to what might be expected if the model were reasonably accurate, Egypt displayed a degree of interaction and linkage with the group which equalled that displayed by the postulated regional states and Italy emerged as the undisputed center of trade interaction. While there are some implications in these findings with regard to the usefulness of the model in terms of trade during the period 1967-1975, there are some other factors which should be considered before rejecting the model altogether.

Because of their geographic position and the make-up of their economics, all the Maghreb states have competing interests in trade with the European market and are dependent upon Europe for certain imports and as markets for their exports. Within the North African grouping, there are no ready markets for many of these export items and there are often intense national rivalries for access to the choice European markets. "It is not surprising, therefore, that intra-Maghreb trade is a small proportion of the exterior trade of each of the Maghreb countries."⁸⁷ As developing countries, the importance of exterior trade is not peculiar to the North African grouping of states.

The low level of intra-Maghreb trade is consistent with trade patterns among under-developed countries generally. Developing countries have relatively little trade with one another. . . . The Maghreb thus fits this characteristic mold, despite the close physical proximity of the countries.⁸⁸

Does this mean then that because developing countries generally engage in little trade with one another there can never be regional groupings comprised of developing countries only? Such an approach would appear to be oversimplistic, ignoring too many other important considerations. The mere fact that a group of states must compete among themselves for trade with the same key developed countries is a shared situation which may tend to draw them together into an economically identifiable entity. Then too, as Cantori and Spiegel have stressed, there is the matter of relative degree.⁸⁹ Just because the members of a group of states engaged in intense trade with other non-group states does not exclude the possibility of a flourishing and well-established intra-group trading network which, while on a smaller scale in terms of dollar value, may be of great importance to the group members. By turning our attention to the members of the postulated region only, we will now attempt to determine if such an intra-group trading network existed in North Africa during the years 1967-1975.

We began our analysis of levels and patterns of trade within the postulated region by examining only the dyadic

trade interactions of the five states comprising this group (columns 1-5 of Tables 10-18). Based upon that systematic examination, a graphic representation of the aggregate interactive trade structure of the postulated region for the years 1967-1975 was drawn (Figure 27). What we have in this graph is a very gross representation which does not address levels of trade but does indicate which countries were trading partners at some time during the nine year survey period.

The aggregate pattern which emerges is a component graph of two distinct subgraphs.⁹⁰ The primary element, made up of the trade linkages among Algeria, Morocco, Tunisia and Libya, is a complete graph, while the secondary element, which includes Algeria, Morocco, Mauritania and Libya, is not complete.⁹¹ The complete trade partner linkages among the three postulated core states (Algeria, Morocco and Tunisia) is supportive of the Cantori and Spiegel model, as is the relatively weak connection between Mauritania (a postulated peripheral state) and the remainder of the group. As a postulated peripheral state also, Libya's strong ties to the core states is not supportive of the model.

When we break the same gross linkage data down by year for a time-series analysis (Figure 28), we gain little more information beyond a fairly clear picture of uniformly strong trade linkages binding Algeria, Morocco,

FIGURE 27
GROSS TRADE INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
AGGREGATE 1967-1975

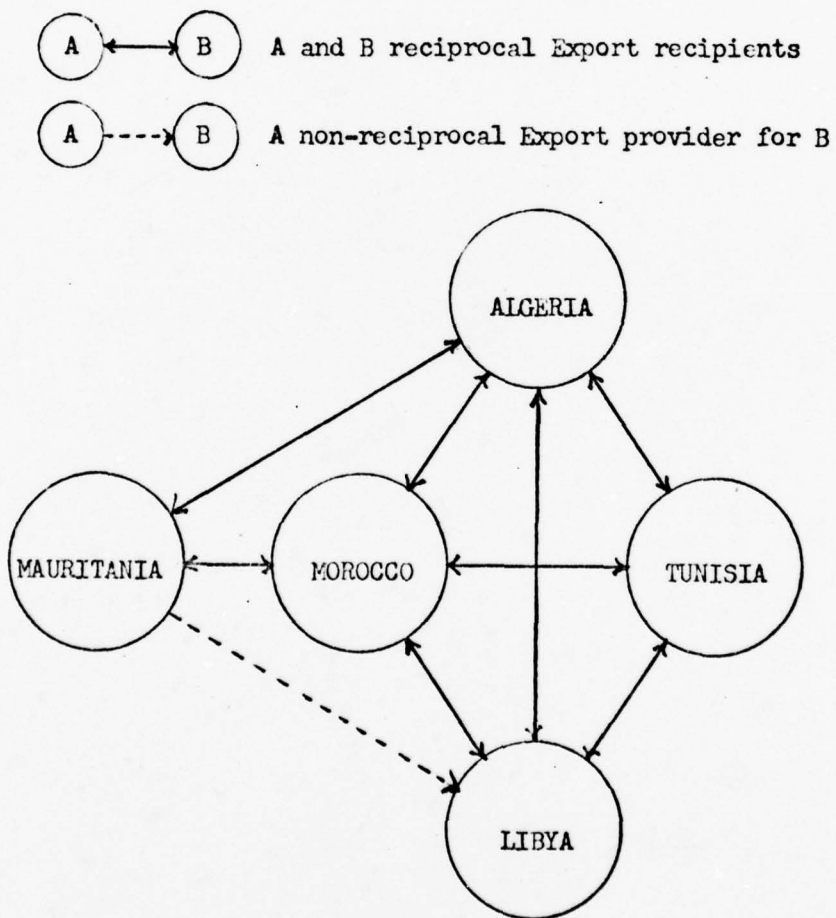
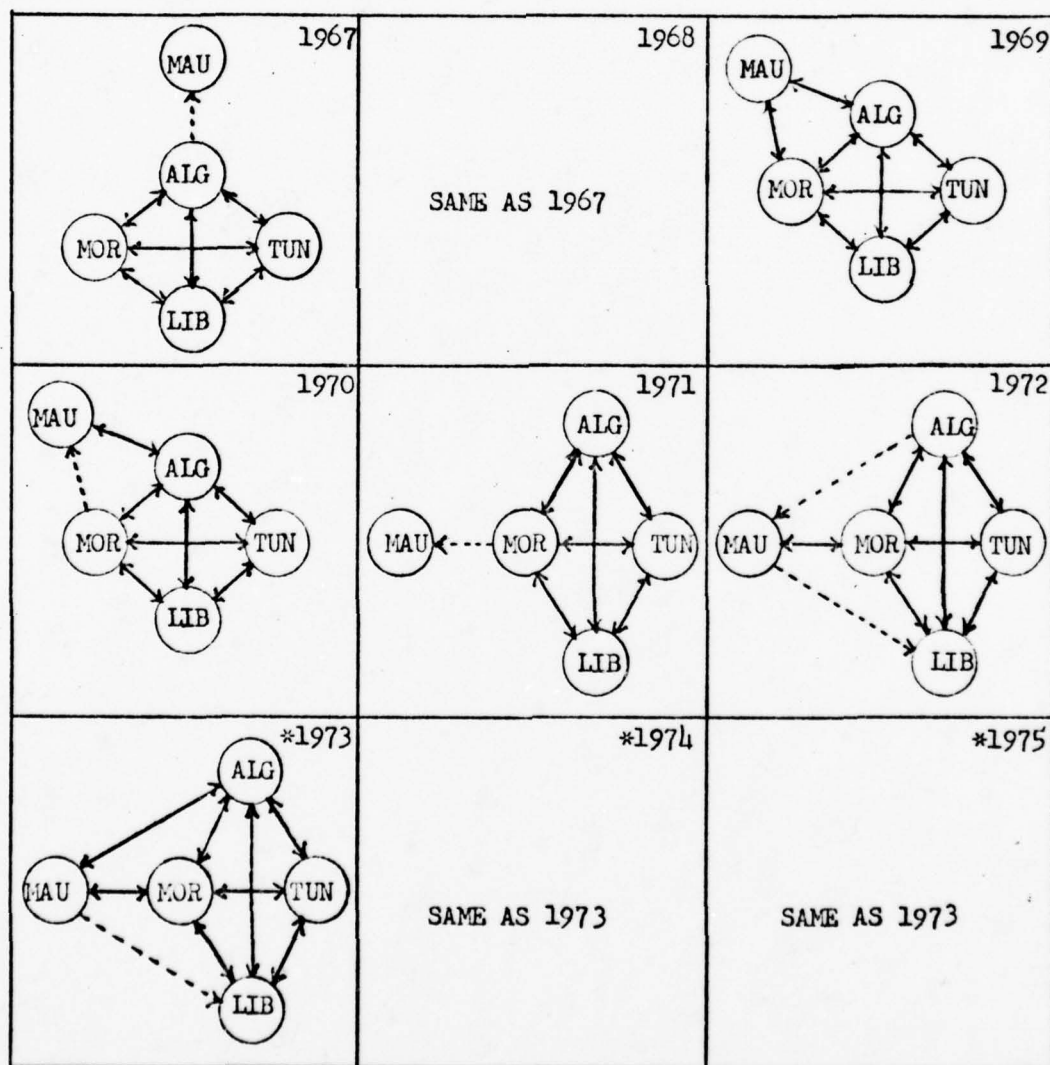
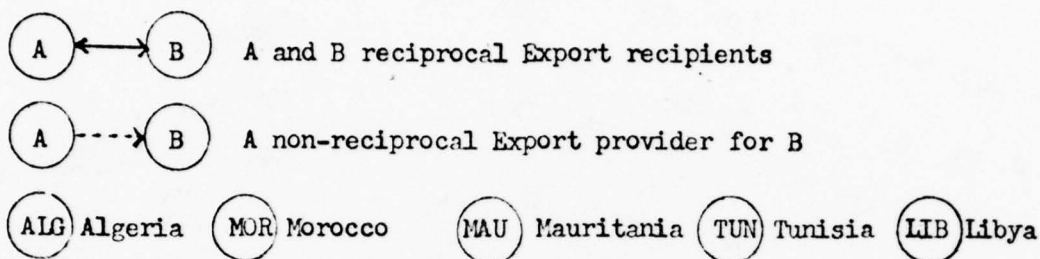


FIGURE 28
GROSS TRADE INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
BY YEAR 1967-1975



*Same as 1967-1975 Aggregate Interactive Structure

Tunisia and Libya together and the variations in Mauritania's very weak ties with the remaining four members of the group. Over the nine year survey period, there was a general trend toward stronger trade linkages between Mauritania and the other group members. Mauritania's linkage in the first two years of the period was extremely weak but by 1973, she had fallen into a pattern which persisted through the end of the survey period in which she had some trade ties with all of the postulated regional grouping except Tunisia.

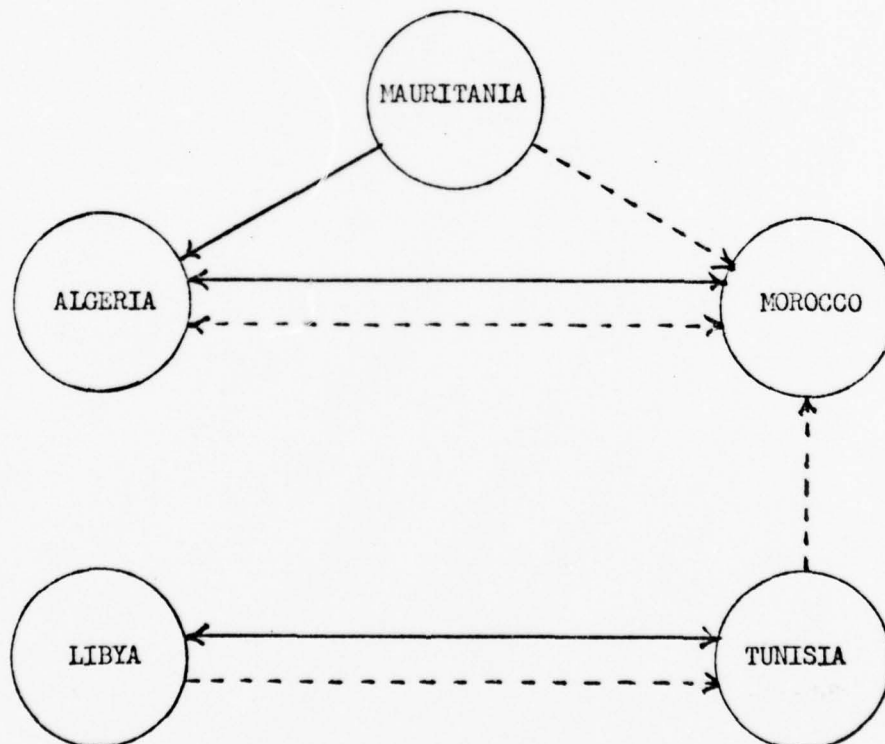
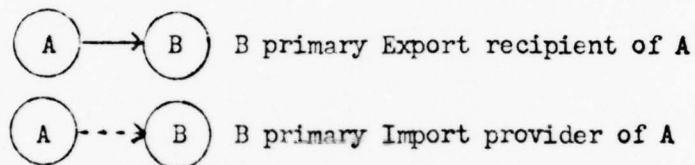
Moving now from assessments of gross trade linkages to techniques which are better equipped to take into account the quality and strength of those linkages, we examine dollar value of trade interaction. From the data contained in columns 1 through 5 (Tables 10-18), we summarized the export and then the import value figures by country dyad for the entire nine year survey period. Based on that summed data, we were able to make an aggregate identification of the primary trading partners within the postulated regional grouping. These findings, reduced to matrix form, are displayed in Table 23. From the information contained in the matrix, a graphic representation of intra-group primary export and primary import trading partners for the aggregate period 1967-1975 was drawn (Figure 29).

TABLE 23
 INTRA-REGION PRIMARY EXPORT AND IMPORT TRADING PARTNERS
 POSTULATED REGION ONLY -- AGGREGATE
 IN TERMS OF TOTAL VALUE
 FOR THE ENTIRE PERIOD 1967-1975

	EXPORTS				
Exporter	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA
MOROCCO		X			
ALGERIA	X				
TUNISIA				X	
LIBYA			X		
MAURITANIA		X			

	IMPORTS				
Importer	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA
MOROCCO		X			
ALGERIA	X				
TUNISIA	X				
LIBYA			X		
MAURITANIA	X				

FIGURE 29
INTRA-REGION PRIMARY TRADING PARTNER INTERACTIVE STRUCTURE
POSTULATED REGION ONLY -- AGGREGATE
IN TERMS OF TOTAL VALUE
FOR THE ENTIRE PERIOD 1967-1975



The pattern which emerges in Figure 29 is another component graph of two distinct subgraphs. The primary element consists of Algeria, Morocco and Mauritania. The trade linkages between Algeria and Morocco are very strong here with each being both the primary intra-group export and import partner of the other. Mauritania's position, in contrast, is totally one of dependence and is split between the other two members of the subgraph (Morocco and Algeria). The secondary element consists of Libya and Tunisia. Here the trade ties between Libya and Tunisia are not as strong as those which exist between Algeria and Morocco. Libya and Tunisia are both the primary intra-group export trading partner of the other, and Tunisia is also Libya's primary import provider, but Tunisia's primary intra-group import partner is Morocco. It is this latter tie between Tunisia and Morocco which joins together what would otherwise be two separate graphs.

In terms of the Cantori and Spiegel model, our findings here are somewhat mixed. The strong ties between Algeria and Morocco are supportive of the postulated core grouping and Mauritania's relatively weak and wholly dependent trade position is supportive of her designation as a peripheral state. But the fairly strong ties between Tunisia and Libya and the weakness of trade linkage between Tunisia and the other postulated core states is not generally supportive of the model.

In an effort to determine what subtle variations in primary trading partners might have occurred over time, we broke the same data down by year for a time-series analysis. The year by year dyadic results are displayed in Table 24. From the information contained in tabular form, graphic representations of intra-group primary export and primary import trading partners were drawn for each of the nine years surveyed (Figure 30).

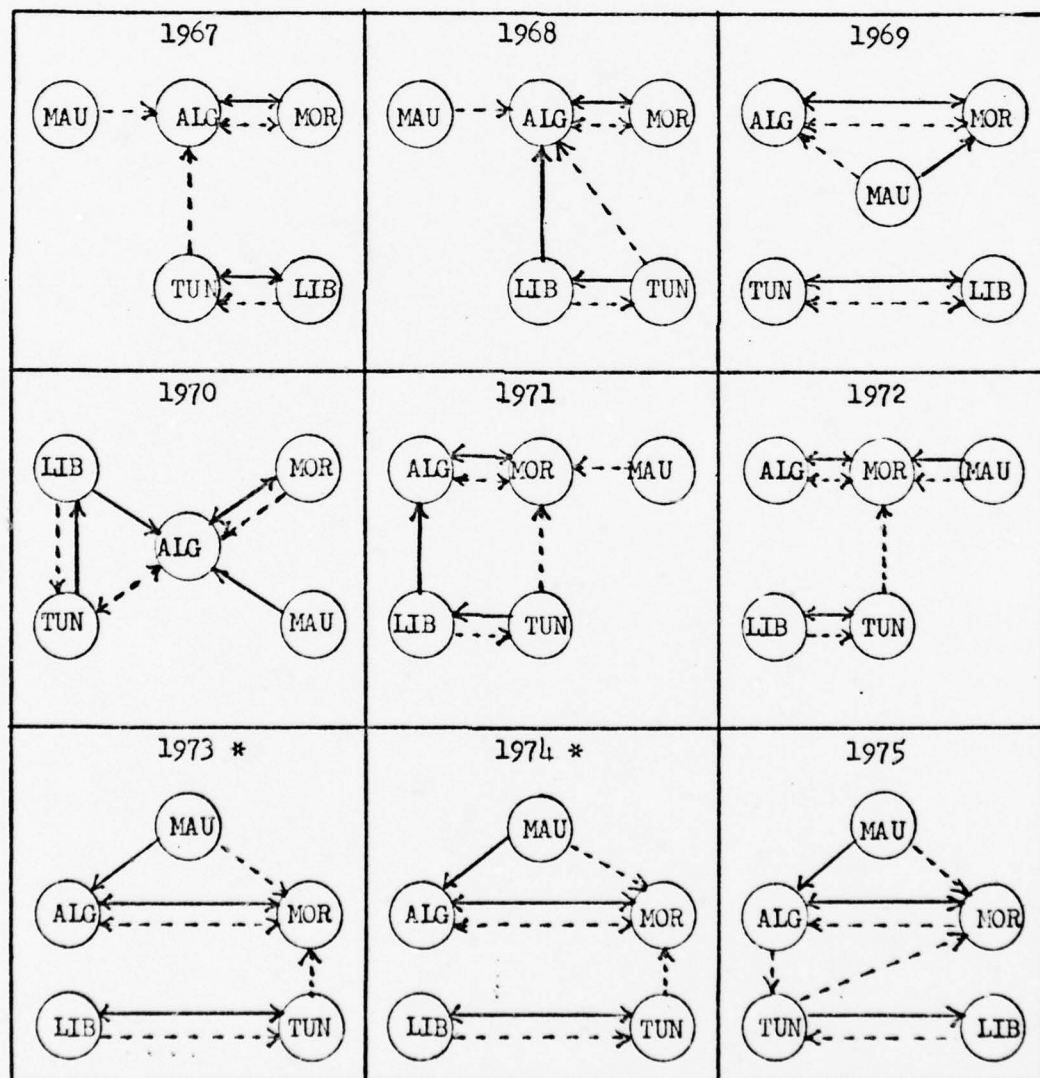
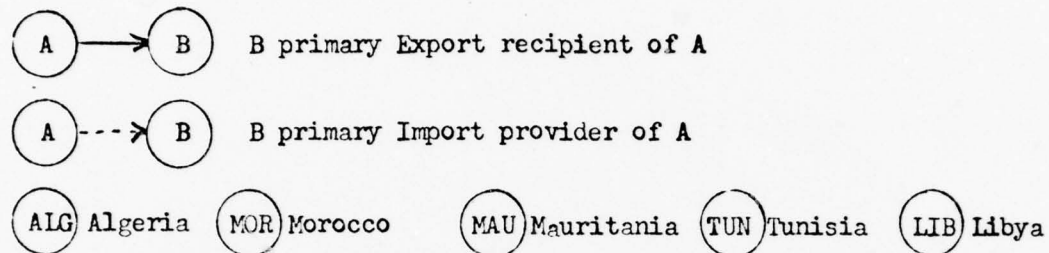
When we study Figure 30, we are struck by the changing nature of intra-group primary trading partners during the nine year survey period. The closest thing to a persistent pattern occurred in 1973 and 1974 when a pattern matching the aggregate emerged. A close examination of the yearly graphs reveals some other significant patterns. At one time or another over the nine year period, Algeria, Morocco and Tunisia were all three linked as either primary export recipient or primary import provider or both. Mauritania was never linked with either Libya or Tunisia and Libya was never linked with Morocco. Thus, when examined on a time-series basis, the intra-group primary trading partner pattern of the postulated regional group is generally supportive of the Cantori and Spiegel model.

The relative strength of the postulated core states as compared with the postulated regional states, in terms of trade linkages, is further supported by an examination of the number of years each member country was a primary

TABLE 24
INTRA-REGION EXPORT AND IMPORT TRADING PARTNERS
POSTULATED REGION ONLY
BY COUNTRY/BY YEAR
1967-1975

	1967	1968	1969	1970	1971	1972	1973	1974	1975
MOROCCO									
Exports	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA
Imports	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA	ALGERIA
ALGERIA									
Exports	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO
Imports	MOROCCO	MOROCCO	MOROCCO	TUNISIA	MOROCCO	MOROCCO	MOROCCO	MOROCCO	TUNISIA
TUNISIA									
Exports	LIBYA	LIBYA	LIBYA	LIBYA	LIBYA	LIBYA	LIBYA	LIBYA	LIBYA
Imports	ALGERIA	ALGERIA	LIBYA	ALGERIA	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO
LIBYA									
Exports	TUNISIA	ALGERIA	TUNISIA	ALGERIA	ALGERIA	TUNISIA	TUNISIA	TUNISIA	MOROCCO
Imports	TUNISIA	TUNISIA	TUNISIA	TUNISIA	TUNISIA	TUNISIA	TUNISIA	TUNISIA	TUNISIA
MAURITANIA									
Exports	None	None	MOROCCO	ALGERIA	None	MOROCCO	ALGERIA	ALGERIA	ALGERIA
Imports	ALGERIA	ALGERIA	ALGERIA	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO	MOROCCO

FIGURE 30
INTRA-REGION PRIMARY TRADING PARTNER INTERACTIVE STRUCTURE
POSTULATED REGION ONLY
BY YEAR 1967-1975



* Same as 1967-1975 Aggregate Interactive Structure

export recipient or import supplier for other countries in the postulated region during the period 1967-1975 (Table 25). When we sum the export figures by country we find that Algeria was the primary intra-group export recipient for 16 country-years, followed by Morocco with 12, Libya with 9 and Tunisia with 5. Mauritania was not a primary recipient of any country in the postulated region during the survey period. In terms of imports supplied, Morocco was first with 18 country-years, followed by Algeria with 15, Tunisia with 11 and Libya 1. Again, Mauritania was not a primary export supplier for any country in the postulated region during the survey period.

Finally, as a means of rank ordering the five states of the postulated region in terms of their intra-group trade volume (measured in 1000's of U.S. dollars), the following calculations were made. Export and import figures from column 8 (Tables 10-18) were summed by country for the nine year period 1967-1975. These total intra-regional export and import figures were then entered by country into Table 26. Total regional group export and import figures were next calculated by summing the figures of each individual country. Based on this data, a percentage of intra-regional export and import was calculated for each country and also entered into Table 26. Graphic representations of these findings are displayed in Figures 31 and 32. In terms of export value ranking within the

TABLE 25
 INTRA-REGION PRIMARY TRADING PARTNER COUNTRY-YEARS
 POSTULATED REGION ONLY
 PERIOD 1967-1975

EXPORTS

Number of Years Each Postulated Region Member was a Primary Export Recipient - By Country					
Exporter	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA
MOROCCO		9			
ALGERIA	9				
TUNISIA				9	
LIBYA	1	3	5		
MAURITANIA	2	4			
Total*	12	16	5	9	0

IMPORTS

Number of Years Each Postulated Region Member was a Primary Import Supplier - By Country					
Importer	MOROCCO	ALGERIA	TUNISIA	LIBYA	MAURITANIA
MOROCCO		9			
ALGERIA	7		2		
TUNISIA	5	3		1	
LIBYA			9		
MAURITANIA	6	3			
Total*	18	15	11	1	0

*Totals indicate the number of country-years each member country was the primary Export Recipient or Import Supplier for other members of the Postulated Region only during the nine year period 1967-1975.

TABLE 26
COMPARATIVE COUNTRY SHARES
OF TOTAL INTRA-REGION TRADE
FOR THE ENTIRE PERIOD 1967-1975

PERIOD 1967 - 1975				
	Total Exports Within Postulated Region By Country 1000 U.S. Dollars	Country % of Total Intra-Reg Exports	Total Imports Within Postulated Region By Country 1000 U.S. Dollars	Country % of Total Intra-Reg Imports
MOROCCO	229431	31.56	297622	32.40
ALGERIA	171048	23.53	318326	34.65
TUNISIA	304879	41.94	64809	7.06
LIBYA	14654	2.02	231187	25.17
MAURITANIA	6858	.94	6648	.72
Total	726870		918592	

FIGURE 31
 BY-COUNTRY INTRA-REGION EXPORT SHARES
 POSTULATED REGION ONLY
 FOR THE ENTIRE PERIOD 1967-1975

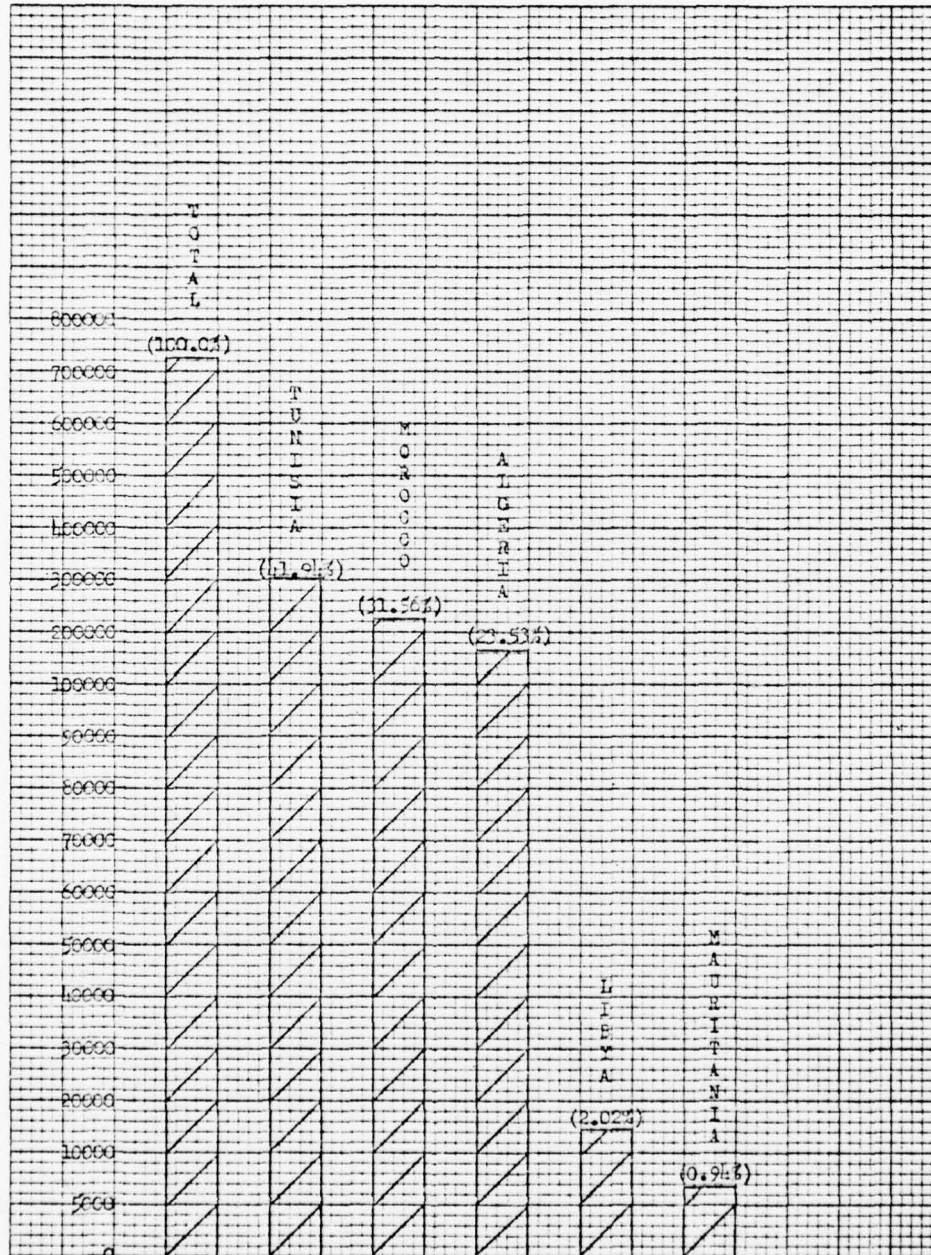
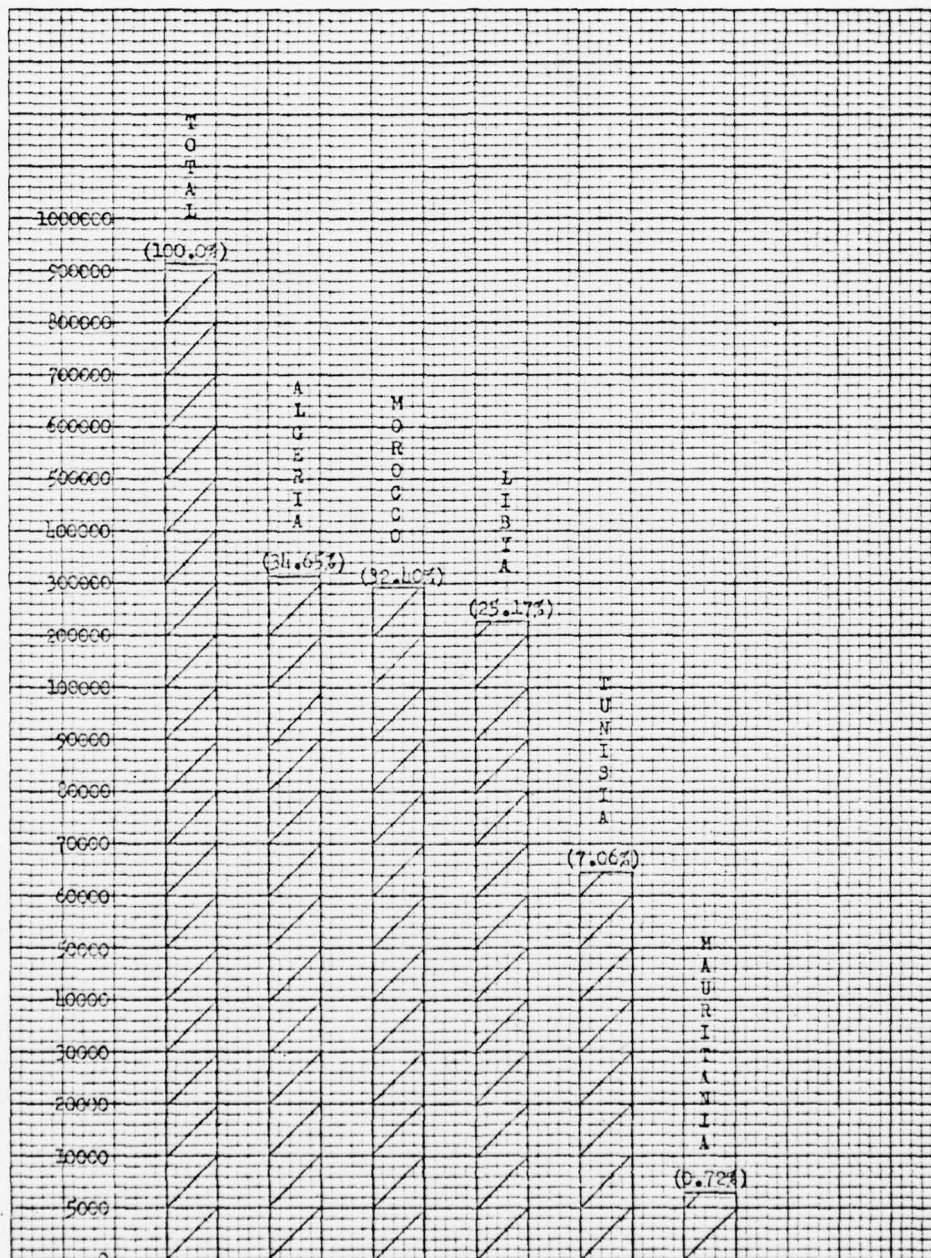


FIGURE 32
BY-COUNTRY INTRA-REGION IMPORT SHARES
POSTULATED REGION ONLY
FOR THE ENTIRE PERIOD 1967-1975



postulated regional group, Tunisia ranked first, followed closely behind by Morocco and Algeria. Libya and Mauritania were well below the postulated core states in a separate grouping. In terms of import value, Algeria ranked first followed closely by Morocco and Libya. Tunisia stood below Libya and somewhat apart, while Mauritania again was well below any other state. These findings, while somewhat mixed, are generally supportive of the core and periphery sub-groupings postulated by the Cantori and Spiegel model.

Having completed aggregate and time-series trade analyses of both the total survey group and the postulated regional group, we will conclude our trade relationship study with two comparative analyses. The first of these is a time-series plot, by country, of trade with the postulated region as a percentage of trade with the survey group. Export and import percentage figures were taken directly from column 12 (Tables 10-18); export plots are displayed in Figure 33 and import plots in Figure 34.⁹²

An analysis of the export plots indicates that over the nine year period, in comparison with their trade with the survey group as a whole, Algeria, Morocco and Tunisia (the postulated core states) maintained higher percentage levels of trade within the region than did Libya and Mauritania (the postulated peripheral states).

FIGURE 33
EXPORTS TO POSTULATED REGION AS PERCENTAGE OF
EXPORTS TO SURVEY GROUP
BY COUNTRY/BY YEAR 1967-1975

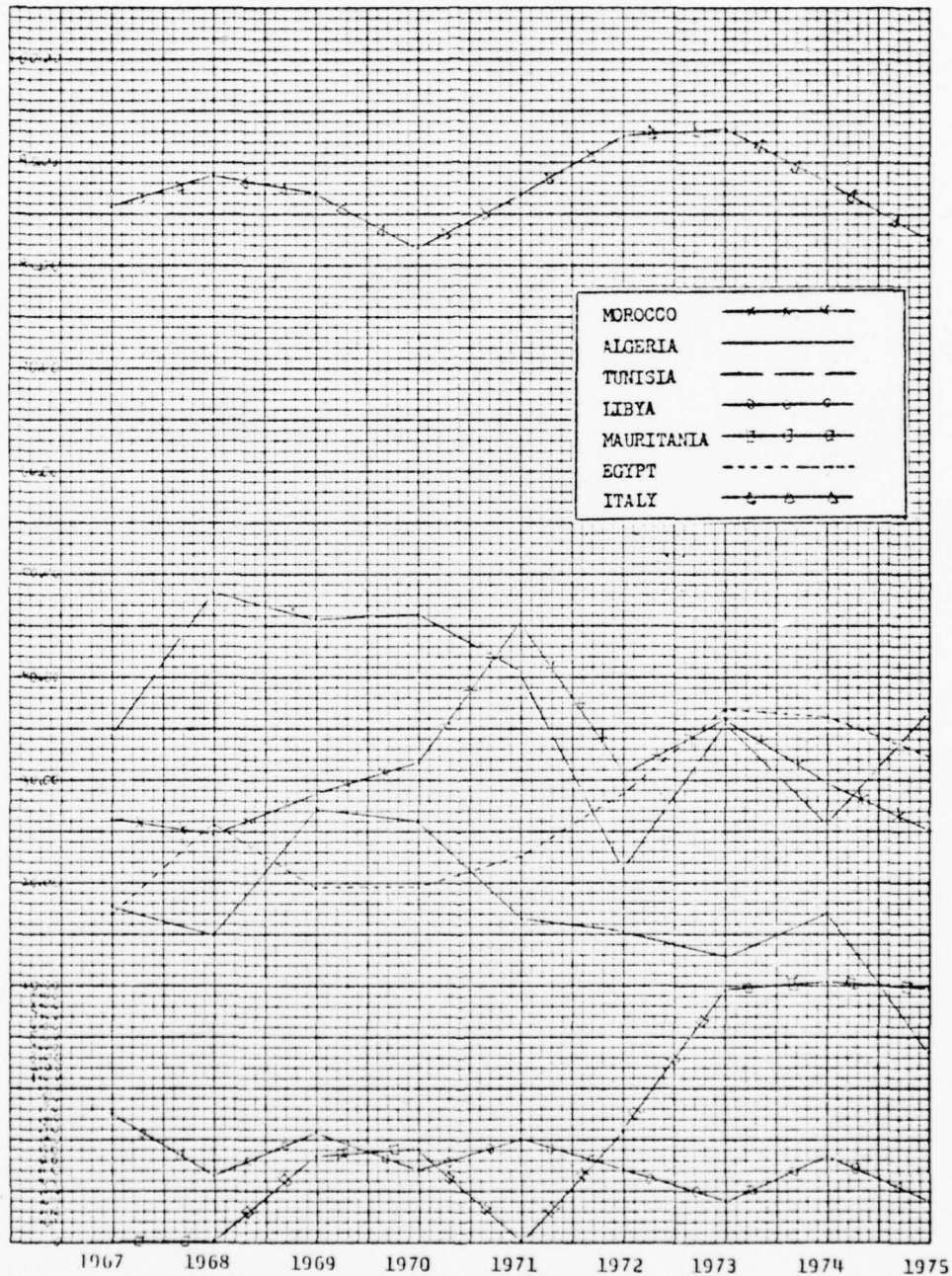
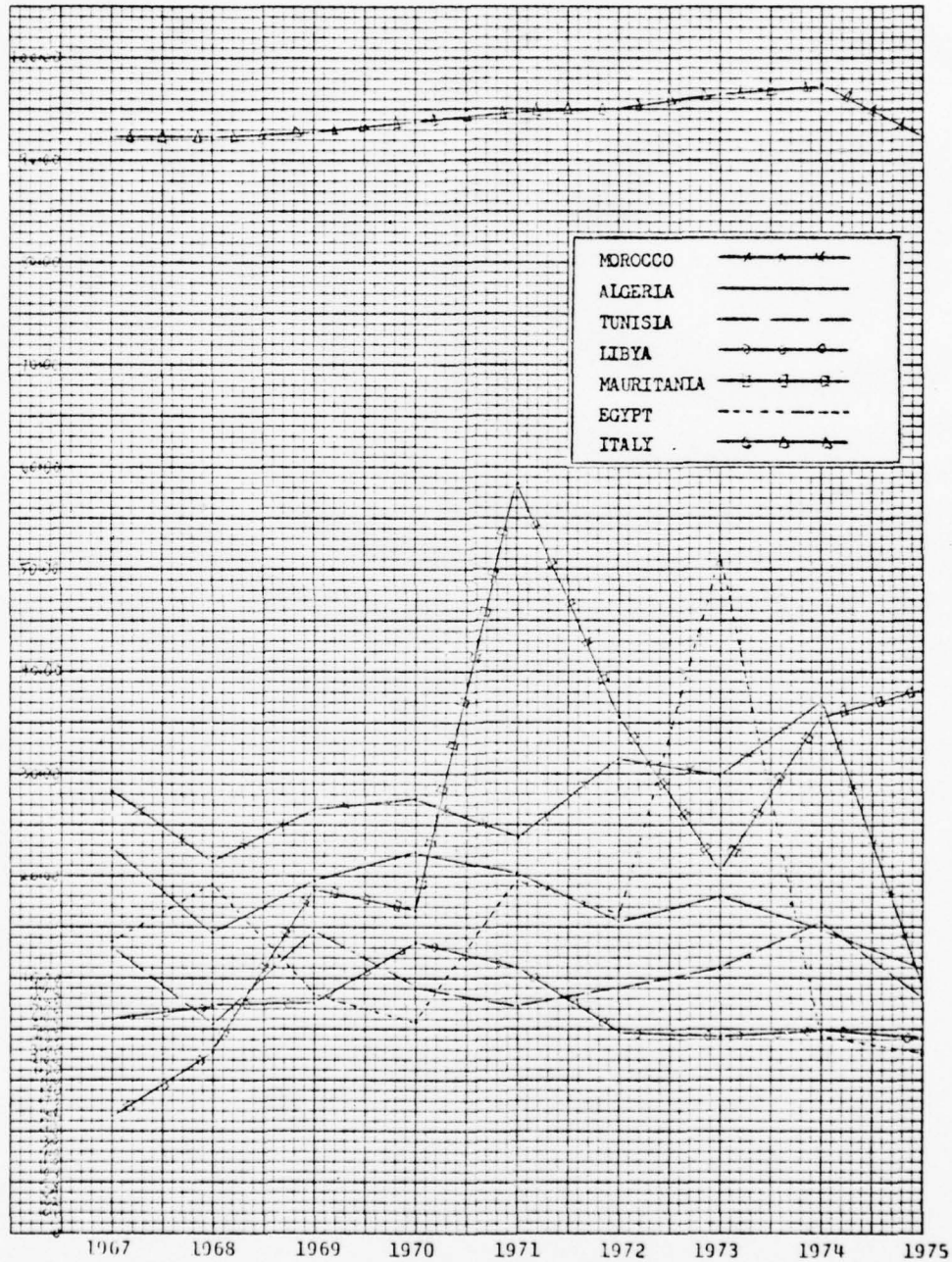


FIGURE 34
 IMPORTS FROM POSTULATED REGION AS PERCENTAGE OF
 IMPORTS FROM SURVEY GROUP
 BY COUNTRY/BY YEAR 1967-1975



An analysis of the import plots indicates again that Algeria, Morocco and Tunisia maintained higher percentage levels of trade within the region, in comparison with their trade with the survey group as a whole, than did Libya, but Mauritania generally rated higher in the case of imports than did any of the other postulated regional members with the exception of Morocco. These findings, while not absolutely consistent with what seems to be suggested by the Cantori and Spiegel model, generally seemed to support the possibility of a regional grouping and a further subdivision of that group into a core and periphery during the nine years of our survey period.

Our final test is a time-series plot, by country, of trade with the postulated region as a percentage of total world trade. Export and import percentage figures were taken from column 11 (Tables 10-18); export plots are displayed in Figure 35 and import plots in Figure 36. An analysis of the export plots first indicates the fairly steady increase of importance of North Africa for both Italy and Egypt as a market for their exports. We also note that over the nine year period, in comparison with their total world exports, Algeria, Morocco and Tunisia maintained higher percentage levels of trade within the region than did Libya and Mauritania.

Turning to an analysis of the import plots, we find indications in the last three years of our survey period

FIGURE 35
 EXPORTS TO POSTULATED REGION AS PERCENTAGE OF
 TOTAL EXPORTS TO WORLD
 BY COUNTRY/BY YEAR 1967-1975

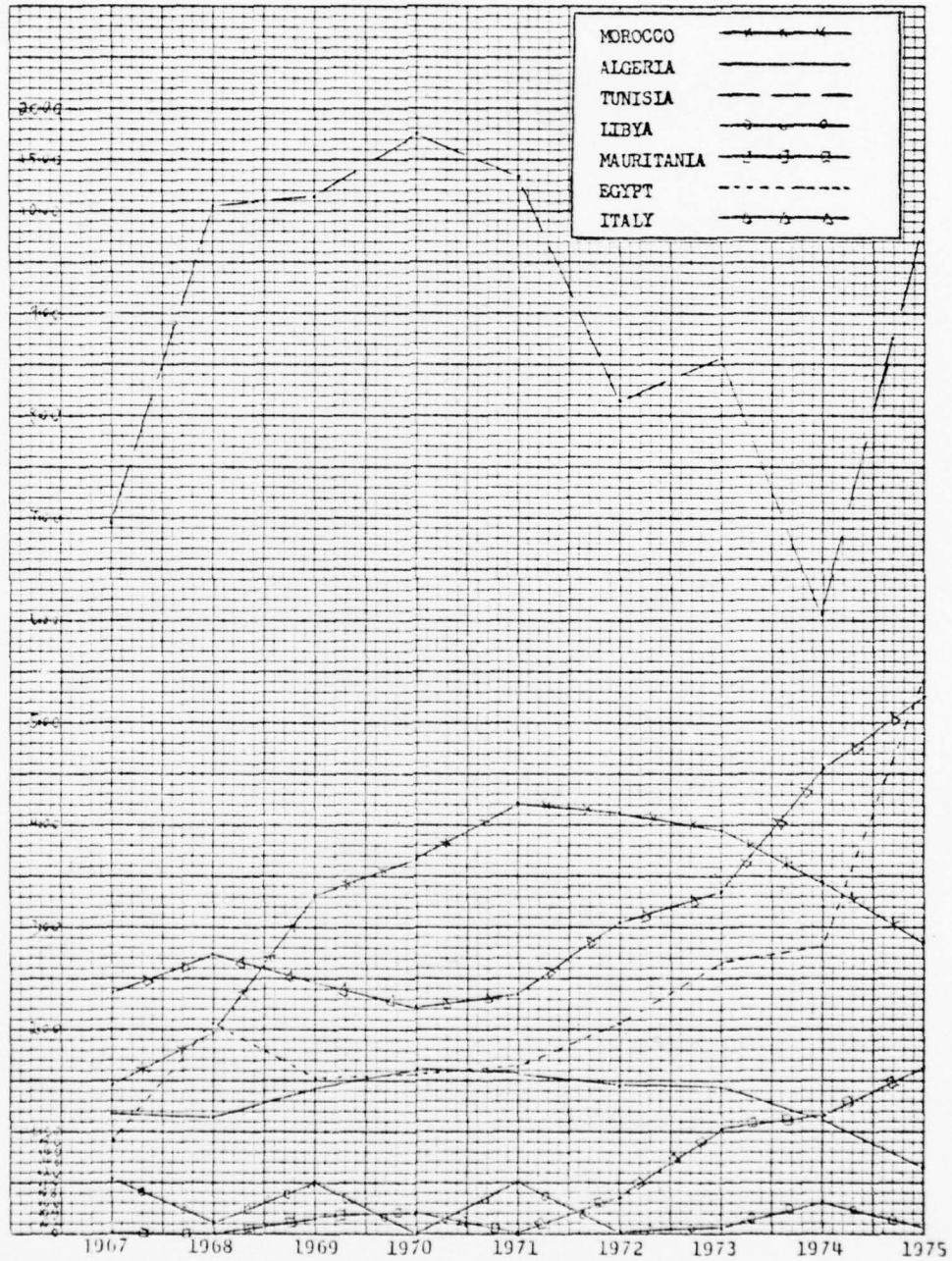
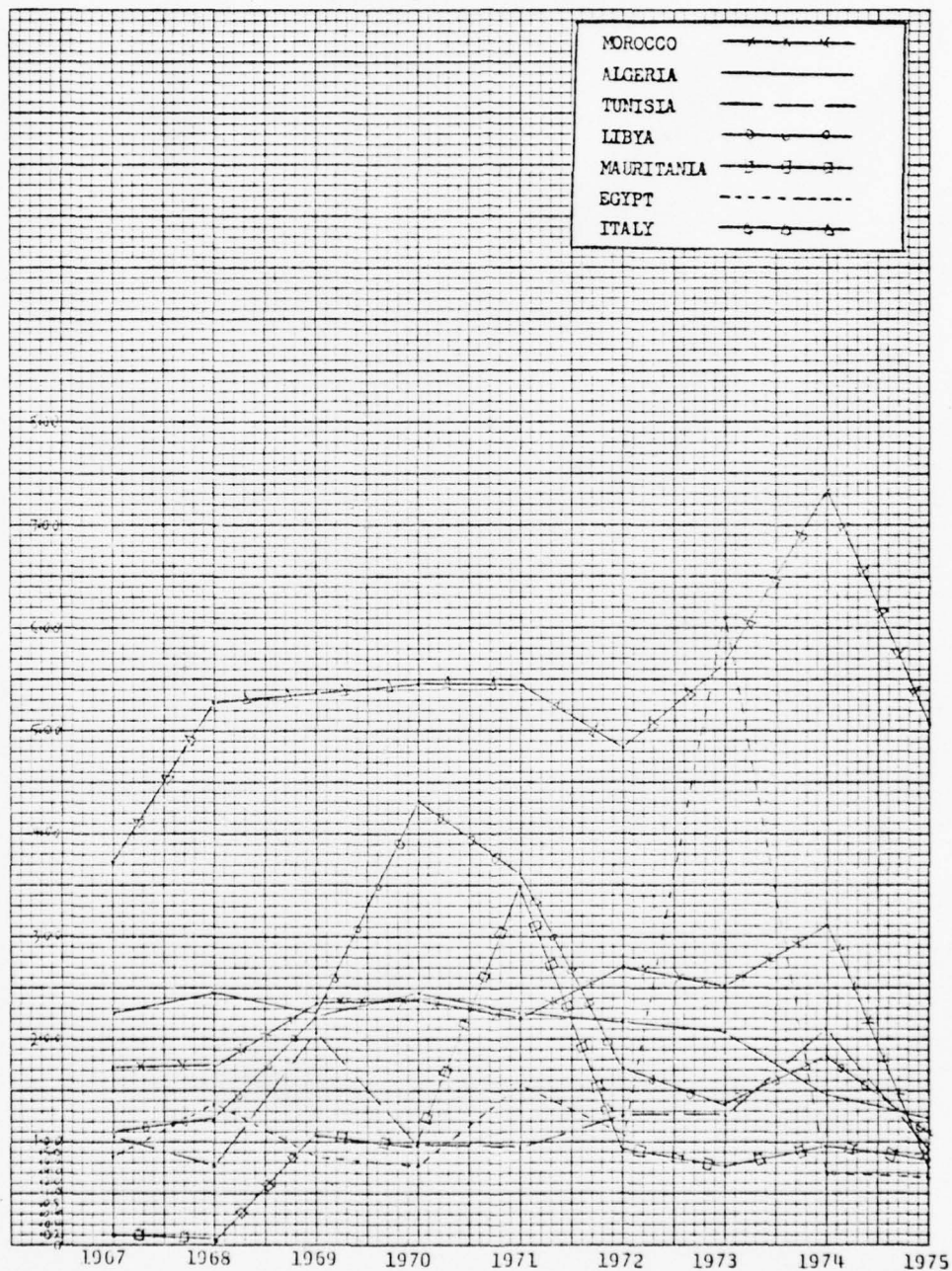


FIGURE 36
 IMPORTS FROM POSTULATED REGION AS PERCENTAGE OF
 TOTAL IMPORTS FROM WORLD
 BY COUNTRY/BY YEAR 1967-1975



that North Africa declined in importance as a source of import goods for Italy and Egypt. Indeed, during the last year of the survey period, intra-regional import trade, as a percentage of total imports, declined in every case (all five postulated regional states and both control states). For a more detailed analysis of trends in trade among all members of the survey group during the period 1967-1975, see the time-series dollar value export plots by country dyad, contained in the Appendix. The graphs were constructed with export data drawn directly from columns 1 through 7 (Tables 10-18). While Libya and Mauritania experienced high intra-regional import levels in the mid-period of our survey (1970-1971), their overall percentages were below those of the postulated core states. In general then, as was the case with intra-regional export levels, this import comparison tends to support the possible existence of a North African regional group as well as the core and peripheral sub-groupings postulated by the Cantori and Spiegel model.

In reviewing the findings of both our aggregate and time-series analyses of trade relationships, we find patterns which are generally supportive of the distinction drawn in the Cantori and Spiegel model between the core states and the peripheral states of the postulated region. Because of the very strong trading position of Italy (one of our control states) among all members of the survey

group, we were unable to gain a clearly defined boundary distinction between those states which might comprise a North African regional group and those which, at least in terms of trade, would not fall into such a grouping. Thus, we can only say that during the nine year period (1967-1975), in terms of trade interactions, there could have been a five state North African region comprised of Algeria, Morocco, Tunisia, Libya and Mauritania. In contrast to our very inconclusive boundary limit findings, our analysis offers stronger indications that trade among the postulated core states was different in quality and quantity than that among the postulated peripheral states.

CHAPTER V

CONCLUSION

The purpose of this paper was to conduct a partial empirical test of the North African regional model postulated by Cantori and Spiegel. In accomplishing our purpose, we have followed a simple outline which began with an examination and interpretation of the Cantori and Spiegel model and discussion of its foundations in the systems approach to international relations. After pointing out the importance of assessing the possibility that a North African regional grouping exists and the desirability of testing a model of that postulated region, we introduced the analytic techniques which we proposed to employ in our test. In presenting those techniques, we attempted to both justify their use by pointing out their strengths and applicability to the task and, at the same time, sensitize ourselves to their limitations by making an honest assessment of what appear to be major weaknesses.

Having thus laid the foundation for our project, we established a seven state survey group which included not only the five postulated members of the Cantori and Spiegel North African regional model, but two control states as

well. Following the test design sequence we had established, we first conducted aggregate and time-series analyses of foreign policy relationships among the states of our survey group during the period 1973-1975.

From our foreign policy findings, we noted what appeared to be certain patterns of intra-systemic interaction as well as patterns among the states of our survey group which suggested a distinction between the quality and quantity of foreign policy interactions among the five members of the postulated region when compared with interactions involving the two control states. While we had no hard evidence to either support or refute the Cantori and Spiegel model on the basis of this first series of tests, we could say somewhat guardedly that there appeared to be a boundary defining the postulated regional grouping of states which seemed to set it somewhat apart from other states, at least in terms of foreign policy relationships during the period 1973-1975. There was scant evidence in our foreign policy analysis concerning the possible existence of core and peripheral sub-groupings within the postulated region.

Next we conducted aggregate and time-series analyses of trade relationships among the states of our survey group. Here, we extended the survey period from three to nine years (1967-1975) in an effort to enhance the sensitivity of our test to trade patterns which might not have

been discernable over shorter periods. Among the seven states of the survey group, the economic dominance of Italy was constant throughout the nine year period. We also found evidence which suggested that in spite of Italy's clearly dominant trade position among the seven states, other trade linkages and interactions also existed which, while of lesser dollar value, seemed important. We also noted certain patterns of intra-systemic trade among the three members of the postulated core when compared with interactions and linkages involving the two postulated peripheral states. As was the case with our foreign policy analysis, we found no hard evidence here to either support or refute the Cantori and Spiegel model. Again, we could say with some caution that there appeared to be core and peripheral sub-groupings as postulated by Cantori and Spiegel, at least in terms of trade relationships during the period 1967-1975. The economic dominance of one of our control states made it impossible to discern a regional boundary in terms of trade relationships.

Taken separately, our foreign policy analysis and our trade analysis seem to offer rather mixed results in assessing the usefulness of the Cantori and Spiegel North African model. When we compare the findings of the two, however, the still guarded judgment we are able to pass is strengthened somewhat by the complementarity of the two analyses. While one offers evidence of a regional group,

distinct from its surroundings, but fails to discern core and peripheral sub-groupings, the other suggests core and periphery, but cannot clearly define encompassing regional boundaries.

Perhaps I William Zartman was correct in arguing that despite many internal similarities, the Maghreb is not a political, economic, or even social unit. It is a geographic unit only in the sense that physical features cut across its internal boundaries, rather than respecting them.⁹³

But just as our findings will not allow us to offer unequivocal support to the Cantori and Spiegel model, neither will they allow us to support Zartman's counter proposition.

Although not within the original scope of our paper, we noted in passing some possible implications for the concept of intrusive systems which we believe worthy of comment. As mentioned earlier, in addition to postulating regional groupings of states which are further broken down into core and peripheral sub-groupings, the Cantoria and Spiegel model also postulates the existence of an intrusive system which they define as ". . . the politically significant participation of external powers in the internal relations of the subordinate system."⁹⁴ In limiting the scope of this paper, we found it necessary to exclude testing of the intrusive system. Nonetheless, in the course of our investigation we found some implications

involving Italy which should at least be considered.

Italy is not identified by Cantori and Spiegel as a member of the intrusive system of North Africa (indeed, that is exactly why we selected Italy as one of our control factor states) and by their definition of "intrusive system" probably should not have been. Our own test offered fairly strong evidence that Italy exerted little political influence in North Africa between 1973 and 1975, at least as measured by foreign policy interactions. On the other hand, Italy's obviously significant economic penetration of North Africa suggests possible weaknesses in the Cantori and Spiegel model both in its definition of "intrusive system" and in its failure to account for the strong influence Italy had in North Africa, at least in the economic sphere.

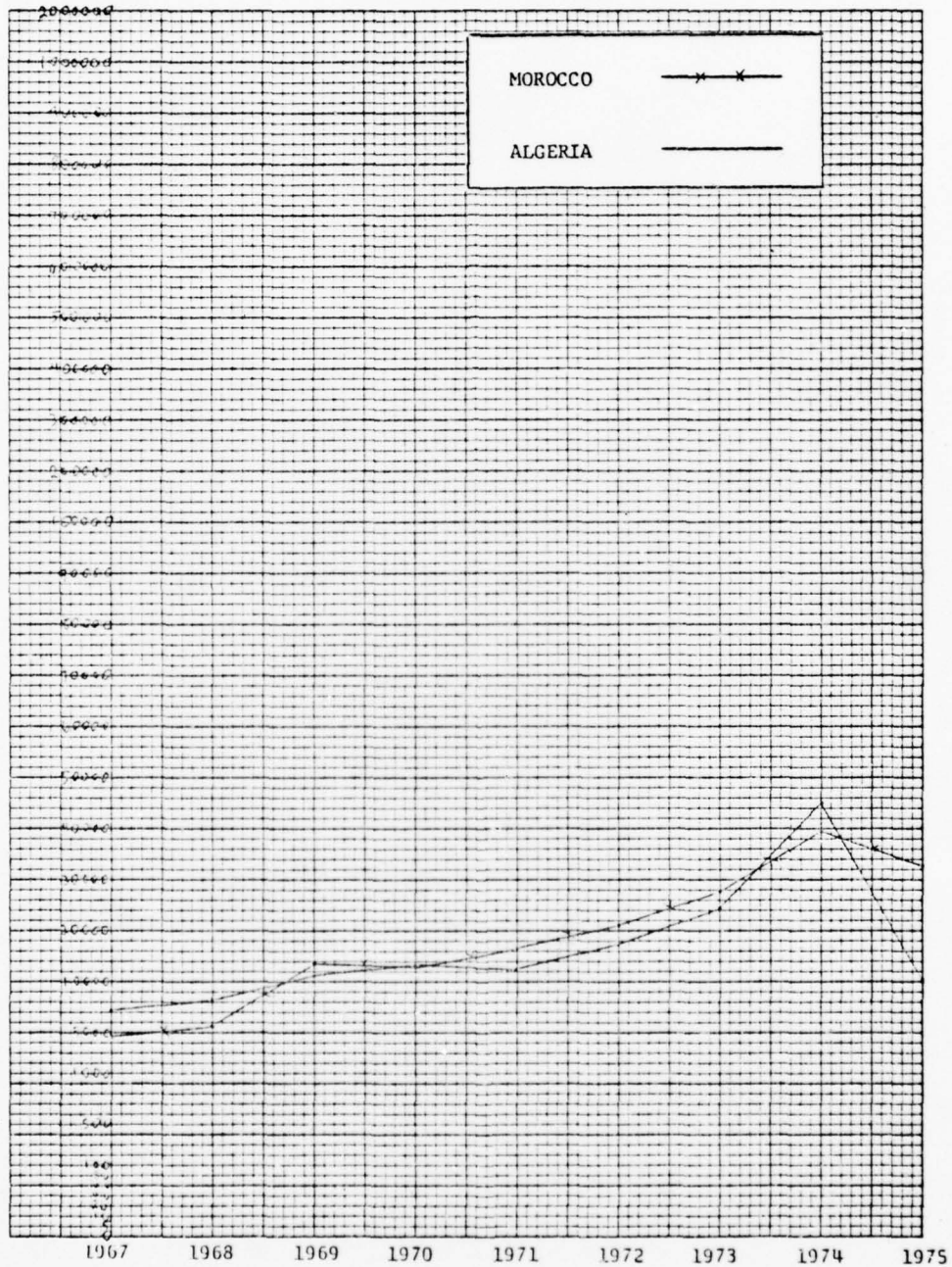
On the whole, while not conclusive in any sense, our evidence would seem to lend more support to the existence of a Maghreb grouping than to a denial of its existence. Before final conclusions can be drawn, however, it is clear that much more testing is needed. While this test can serve as a foundation on which to build our knowledge about systemic interactions among the states of North Africa, further investigations are needed which are able to broaden the range of attributes tested and which cover a greater span of time. It is hoped that this study will encourage others to undertake such investigations.

APPENDIX

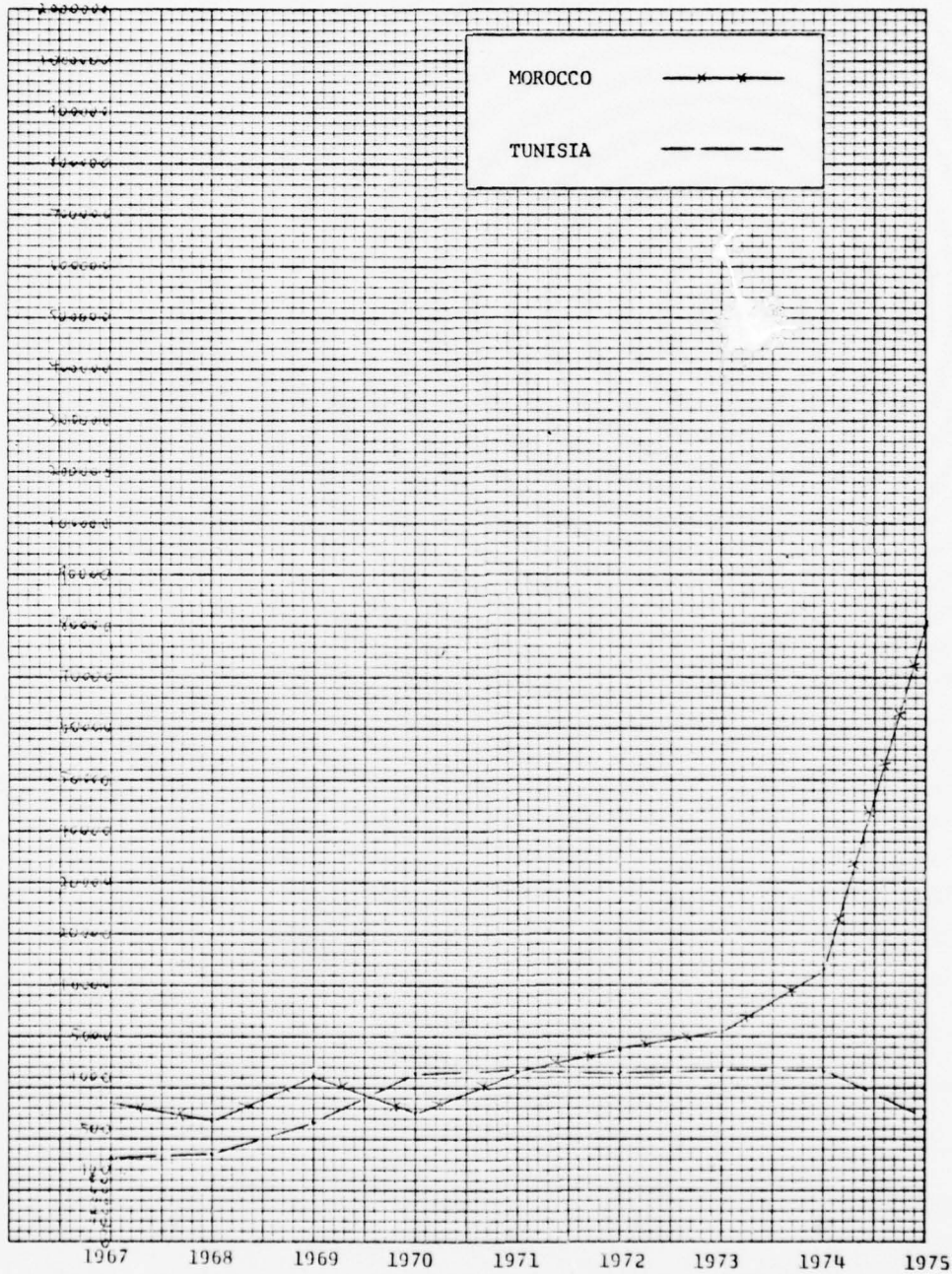
TIME-SERIES TRENDS IN TRADE
AMONG SURVEY GROUP MEMBER DYADS
IN TERMS OF EXPORT DOLLAR VALUES

1967-1975

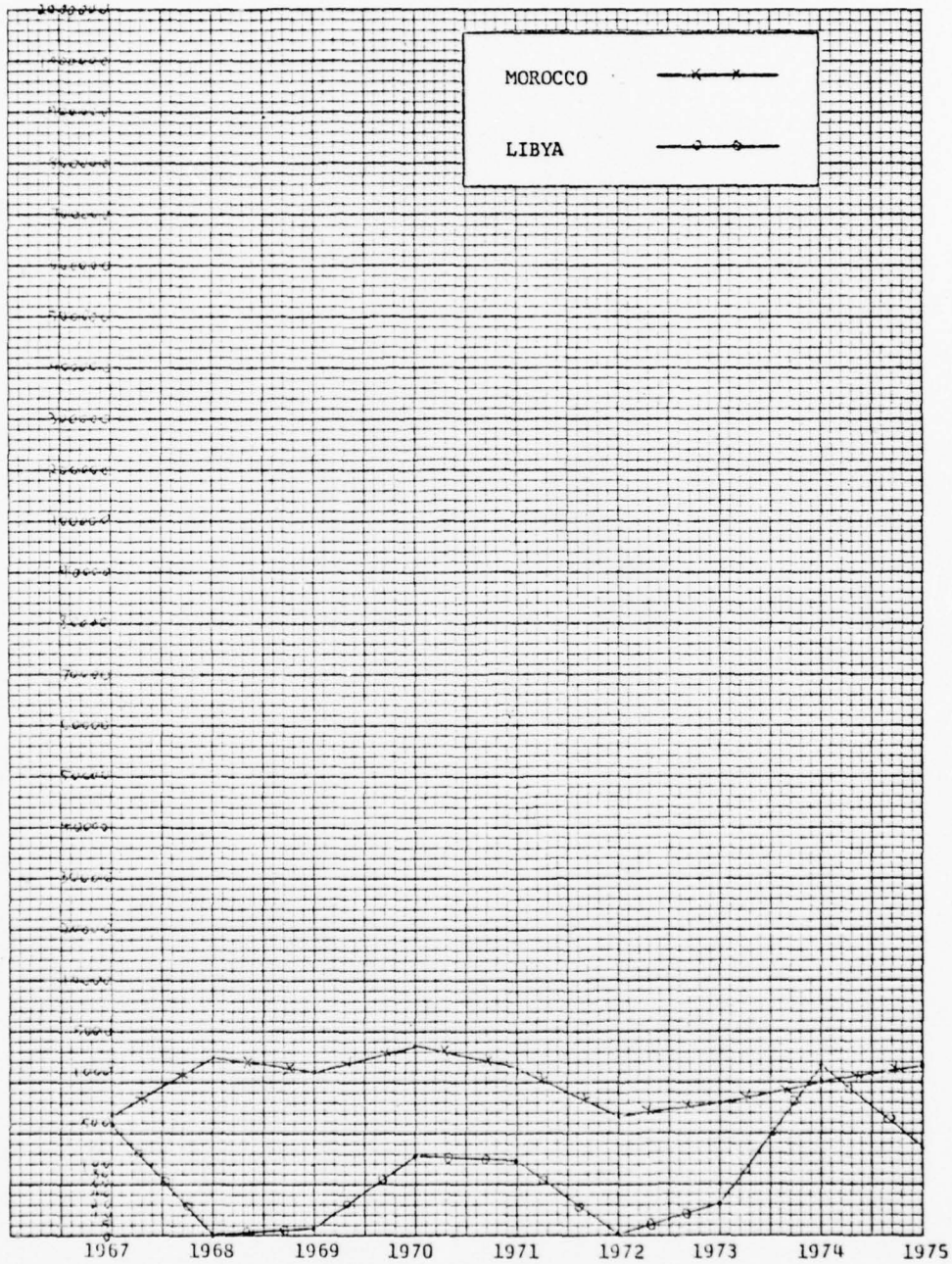
APPENDIX -- FIGURE 1
MOROCCO EXPORTS TO ALGERIA/ALGERIA EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



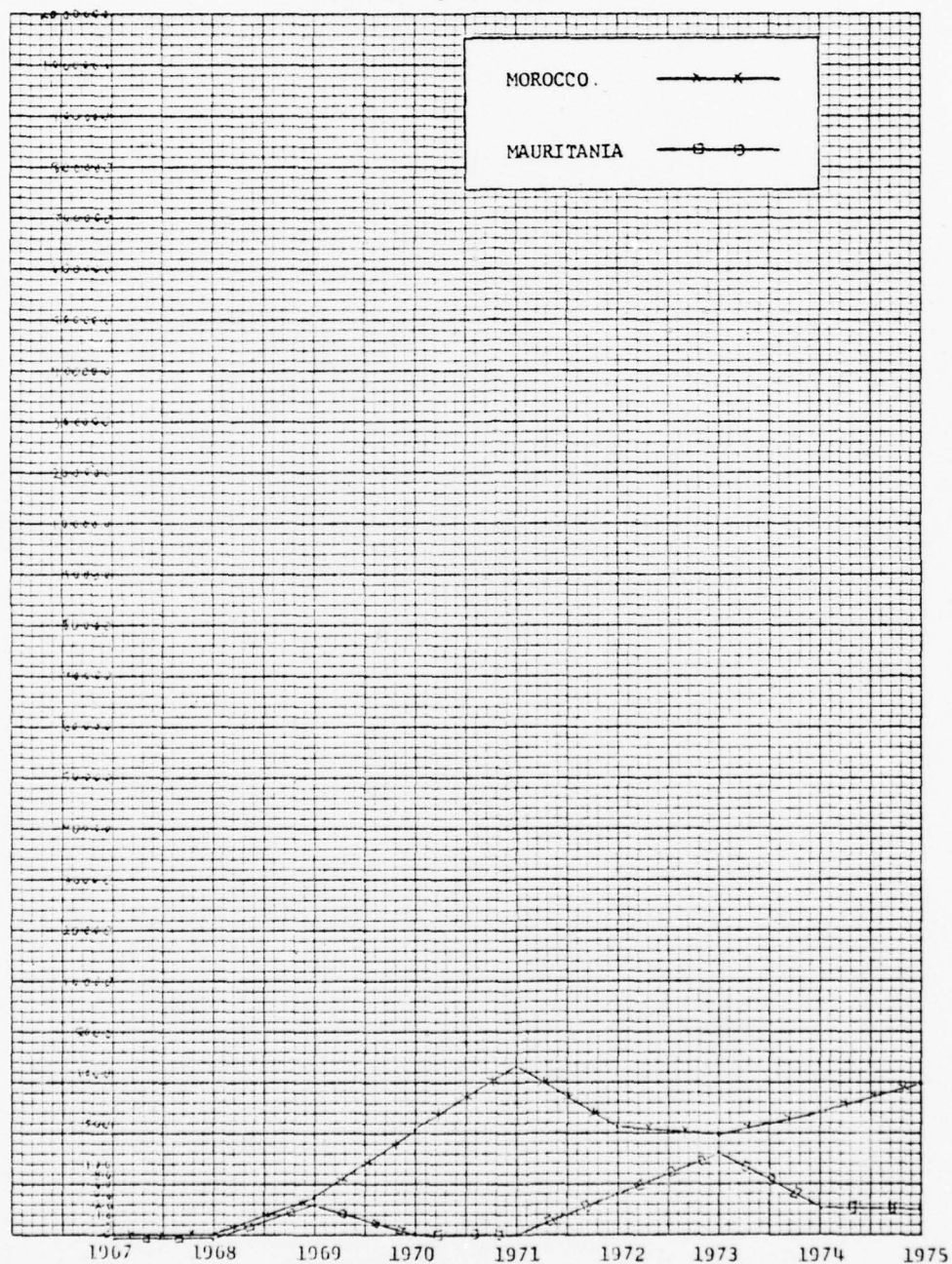
APPENDIX -- FIGURE 2
MOROCCO EXPORTS TO TUNISIA/TUNISIA EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



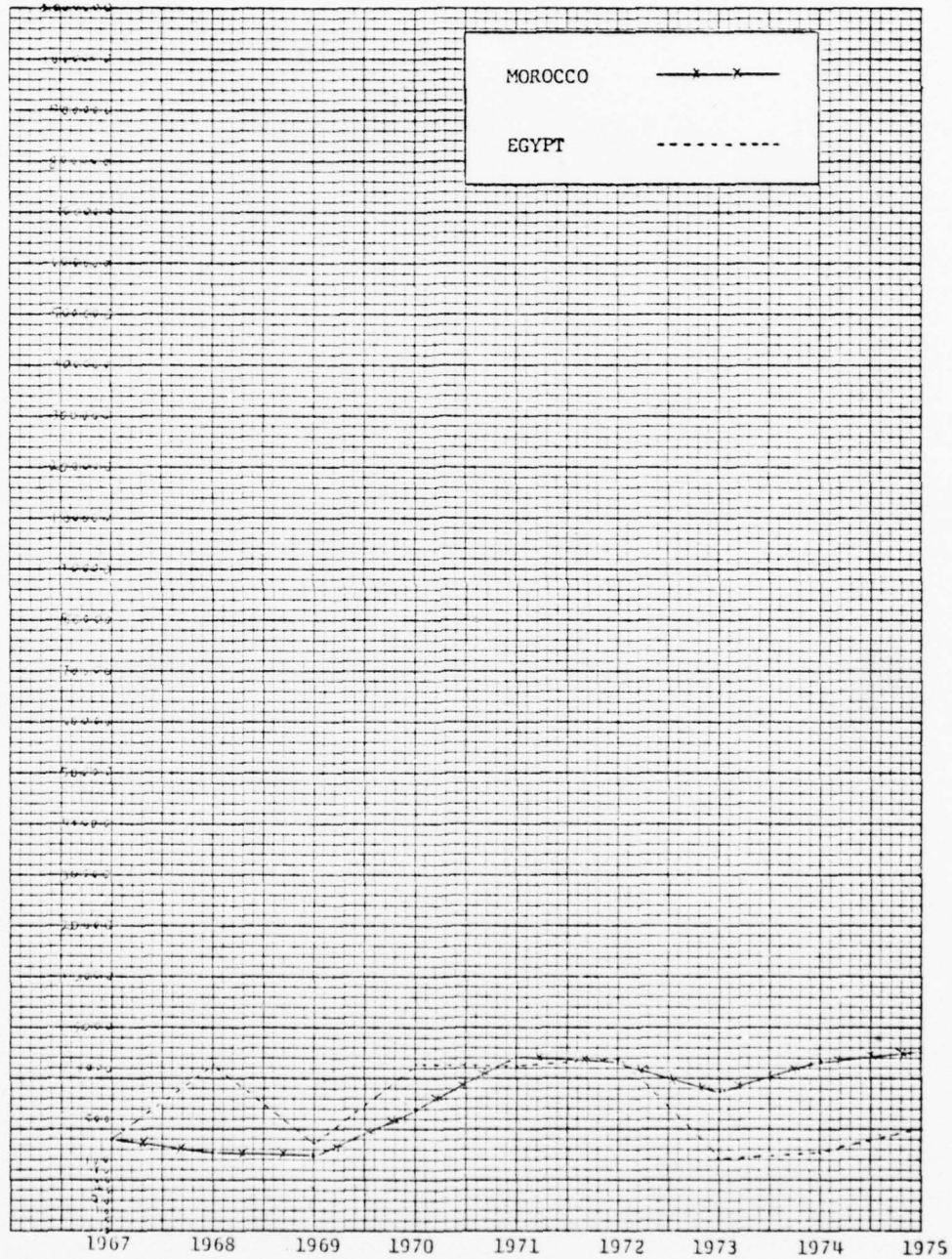
APPENDIX -- FIGURE 3
MOROCCO EXPORTS TO LIBYA/LIBYA EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



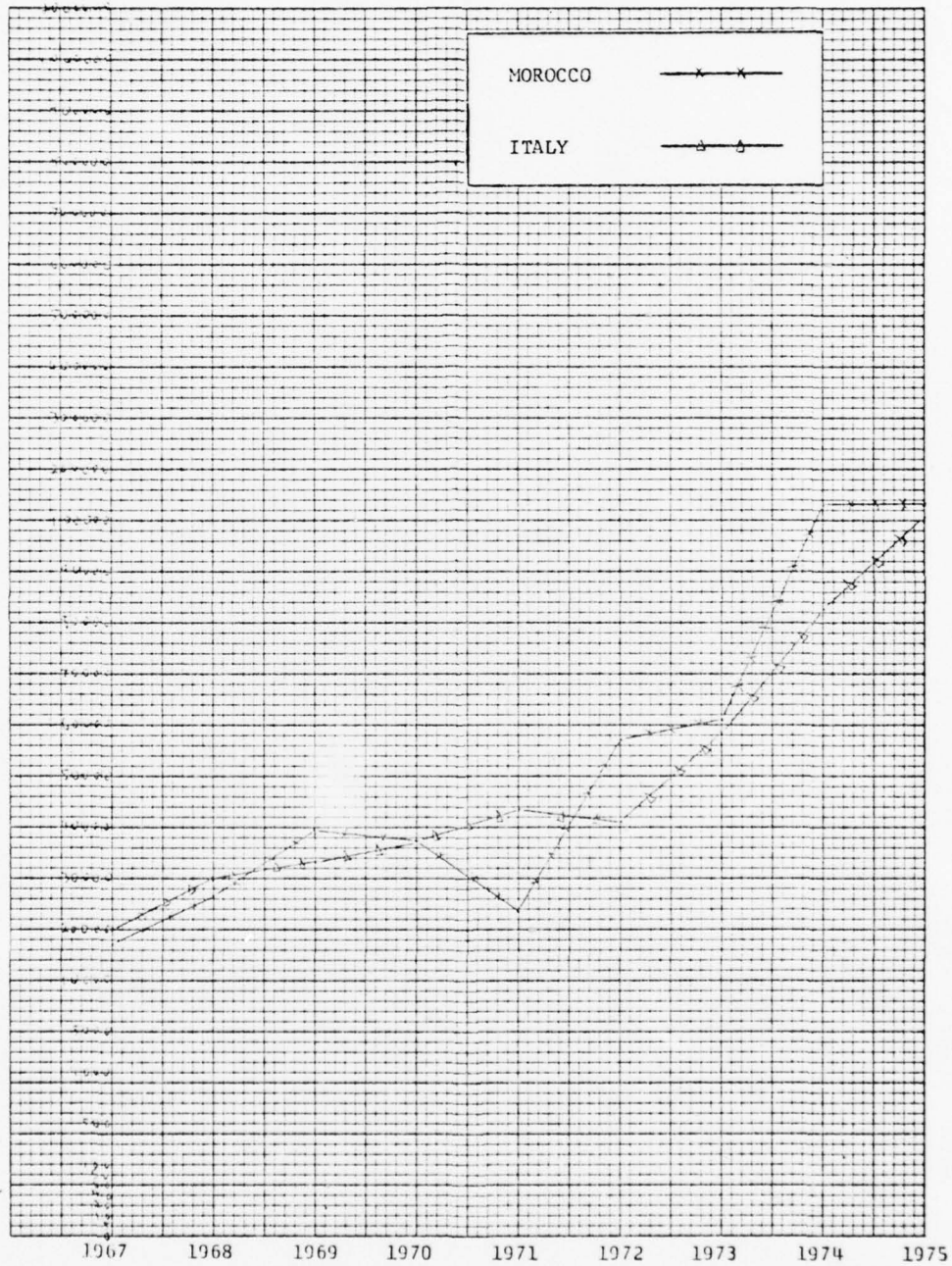
APPENDIX -- FIGURE 4
MOROCCO EXPORTS TO MAURITANIA/MAURITANIA EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



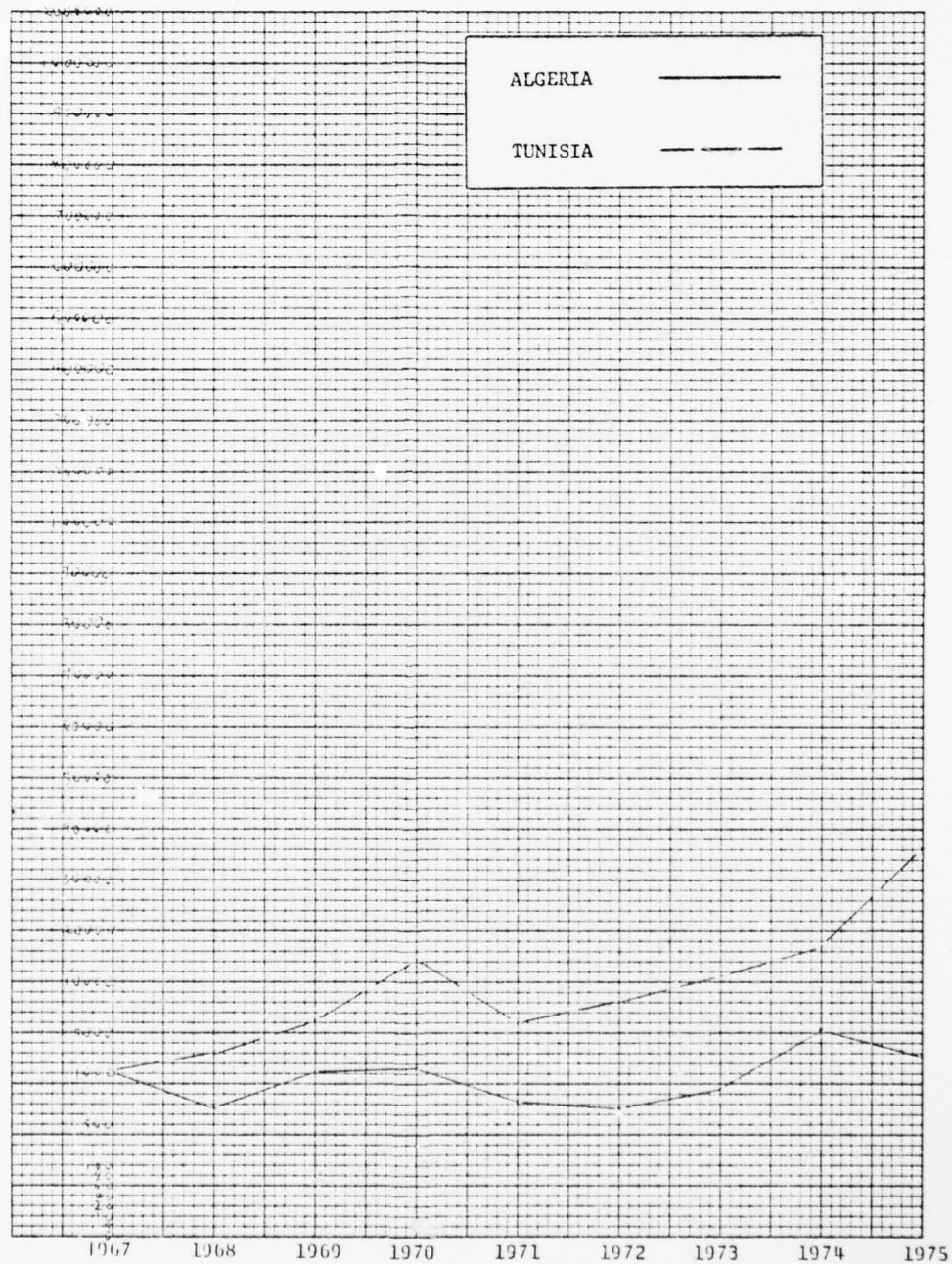
APPENDIX -- FIGURE 5
MOROCCO EXPORTS TO EGYPT/EGYPT EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



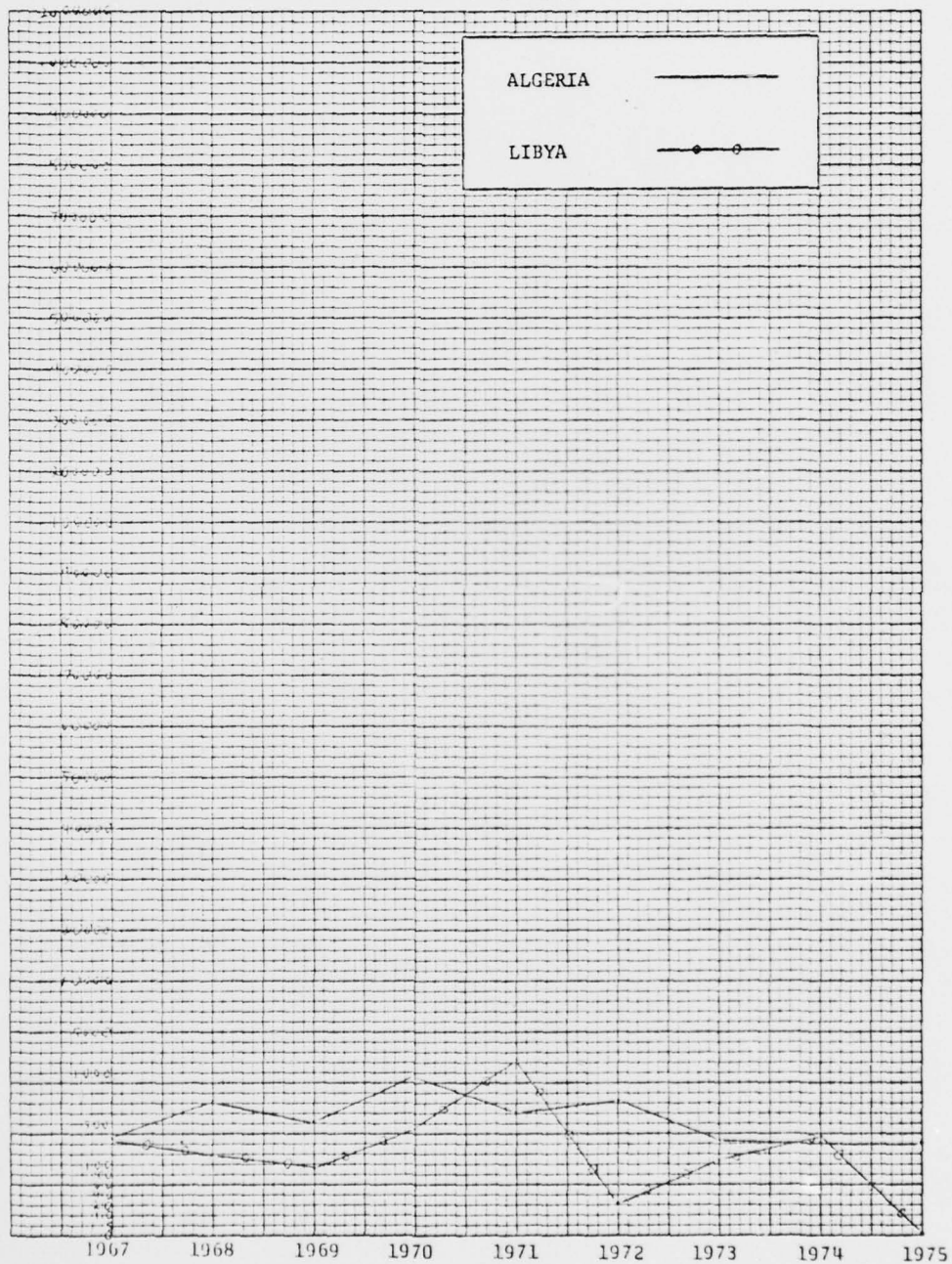
APPENDIX -- FIGURE 6
MOROCCO EXPORTS TO ITALY/ITALY EXPORTS TO MOROCCO
1000 U.S. DOLLARS
BY YEAR 1967-1975



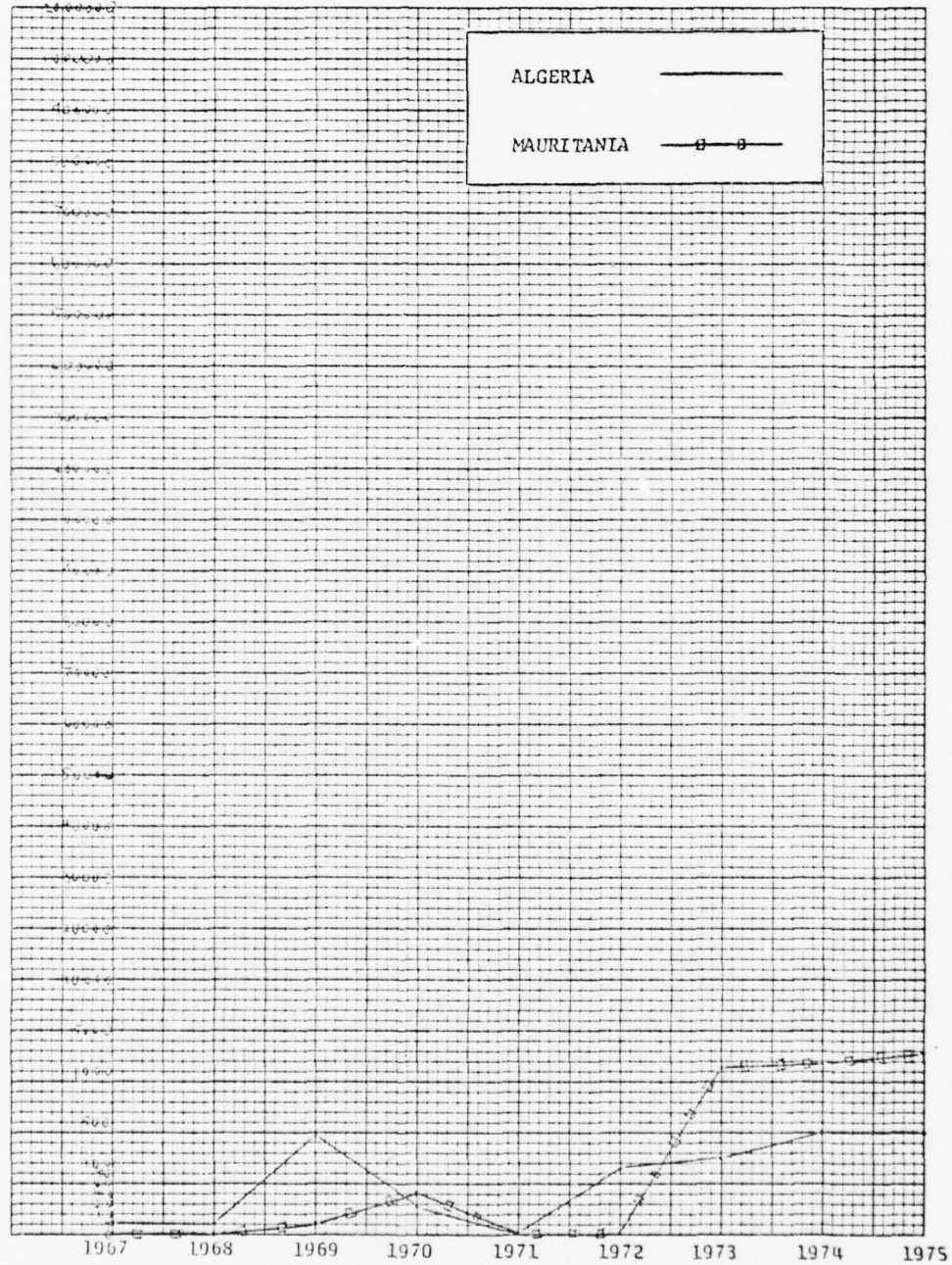
APPENDIX -- FIGURE 7
ALGERIA EXPORTS TO TUNISIA/TUNISIA EXPORTS TO ALGERIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



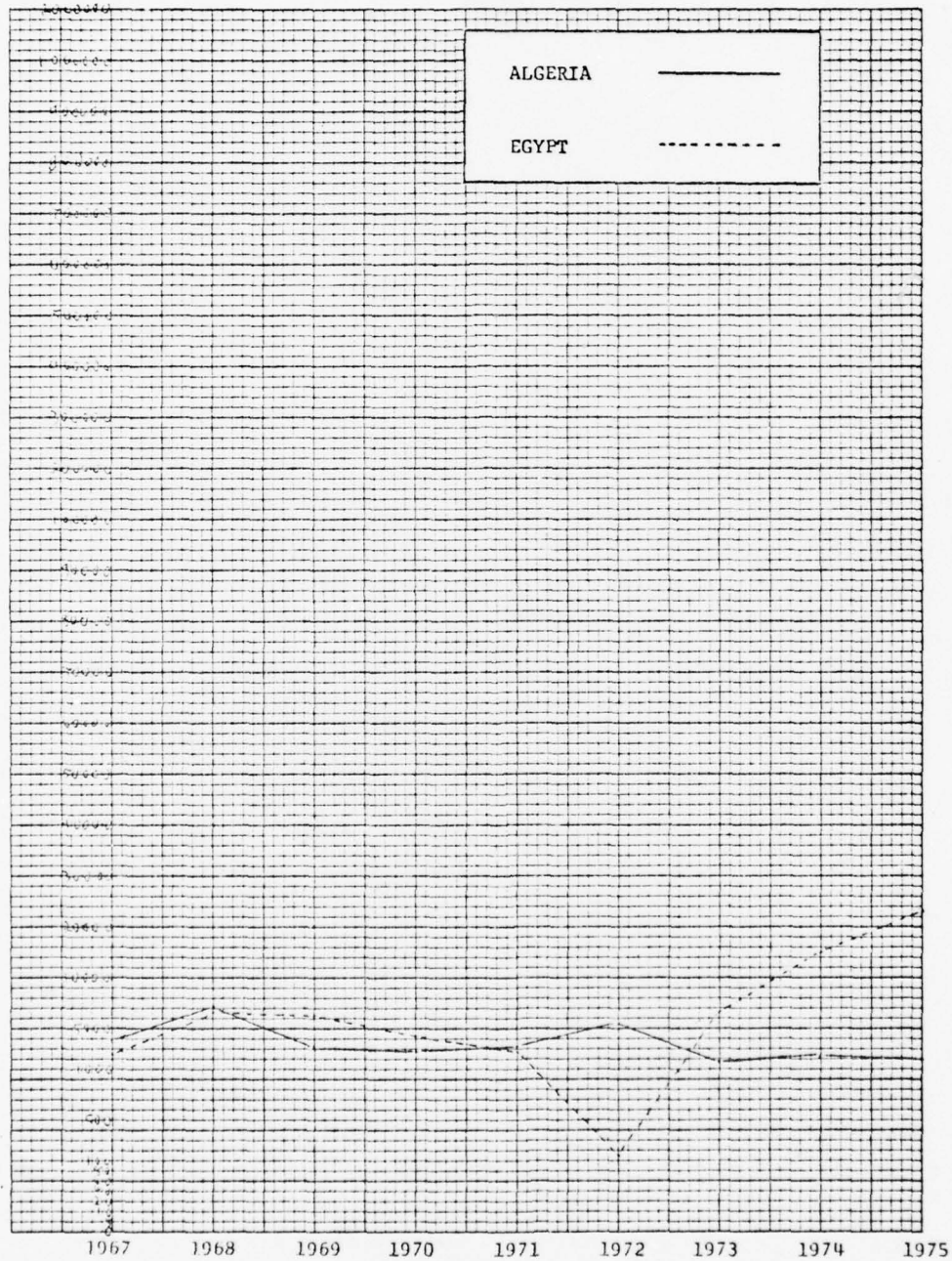
APPENDIX -- FIGURE 8
ALGERIA EXPORTS TO LIBYA/LIBYA EXPORTS TO ALGERIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



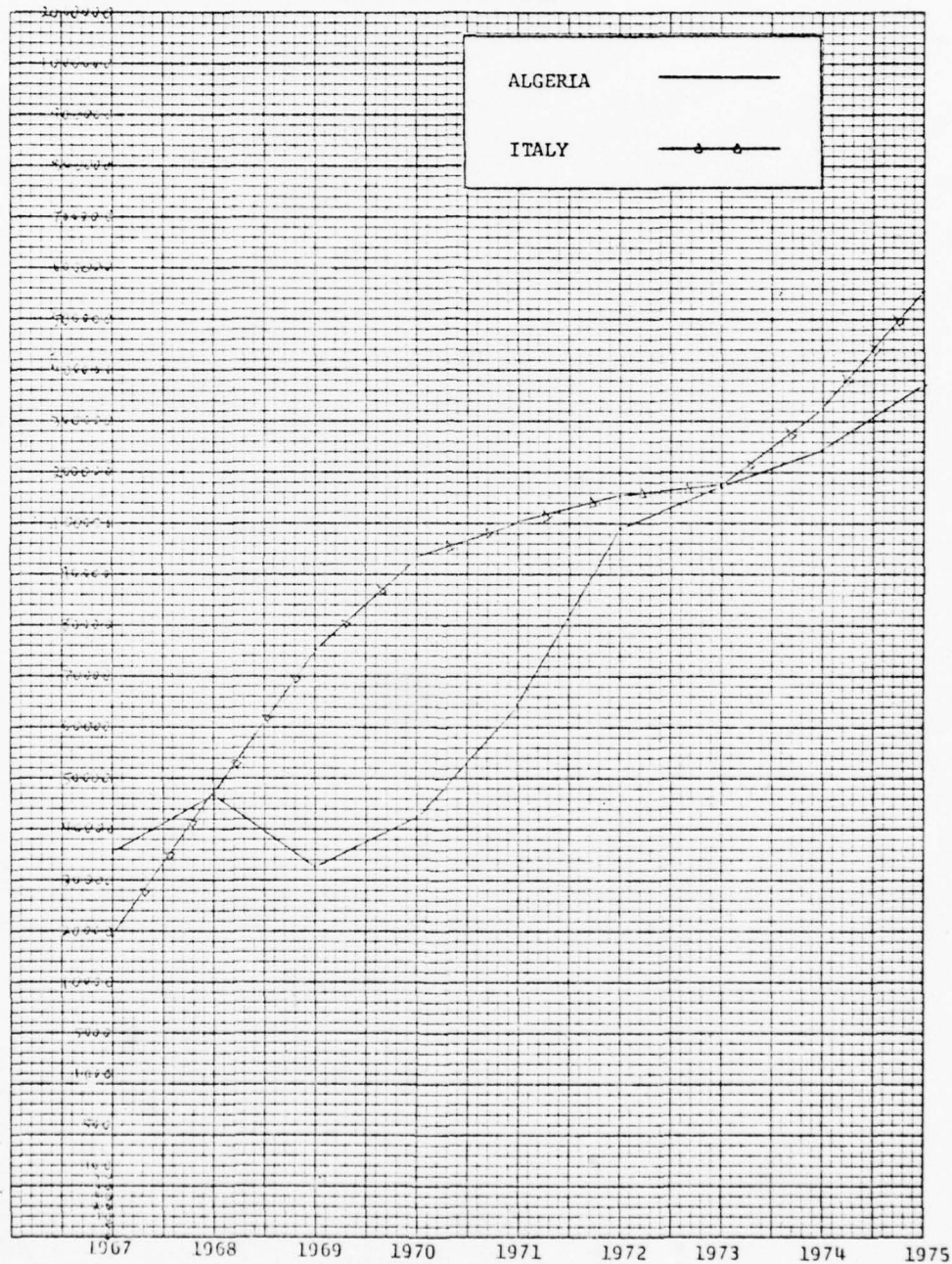
APPENDIX -- FIGURE 9
ALGERIA EXPORTS TO MAURITANIA/MAURITANIA EXPORTS TO ALGERIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



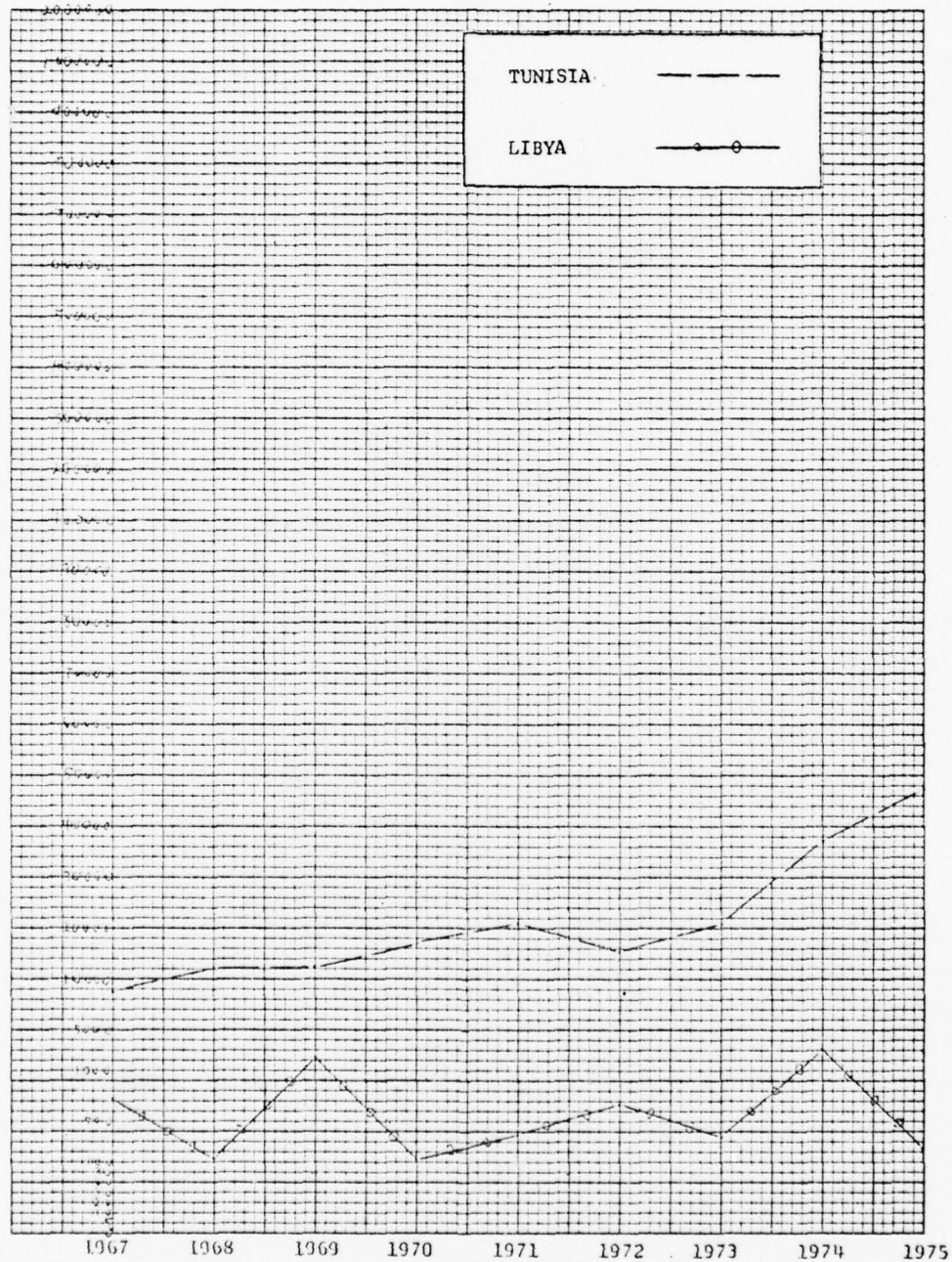
APPENDIX -- FIGURE 10
ALGERIA EXPORTS TO EGYPT/EGYPT EXPORTS TO ALGERIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



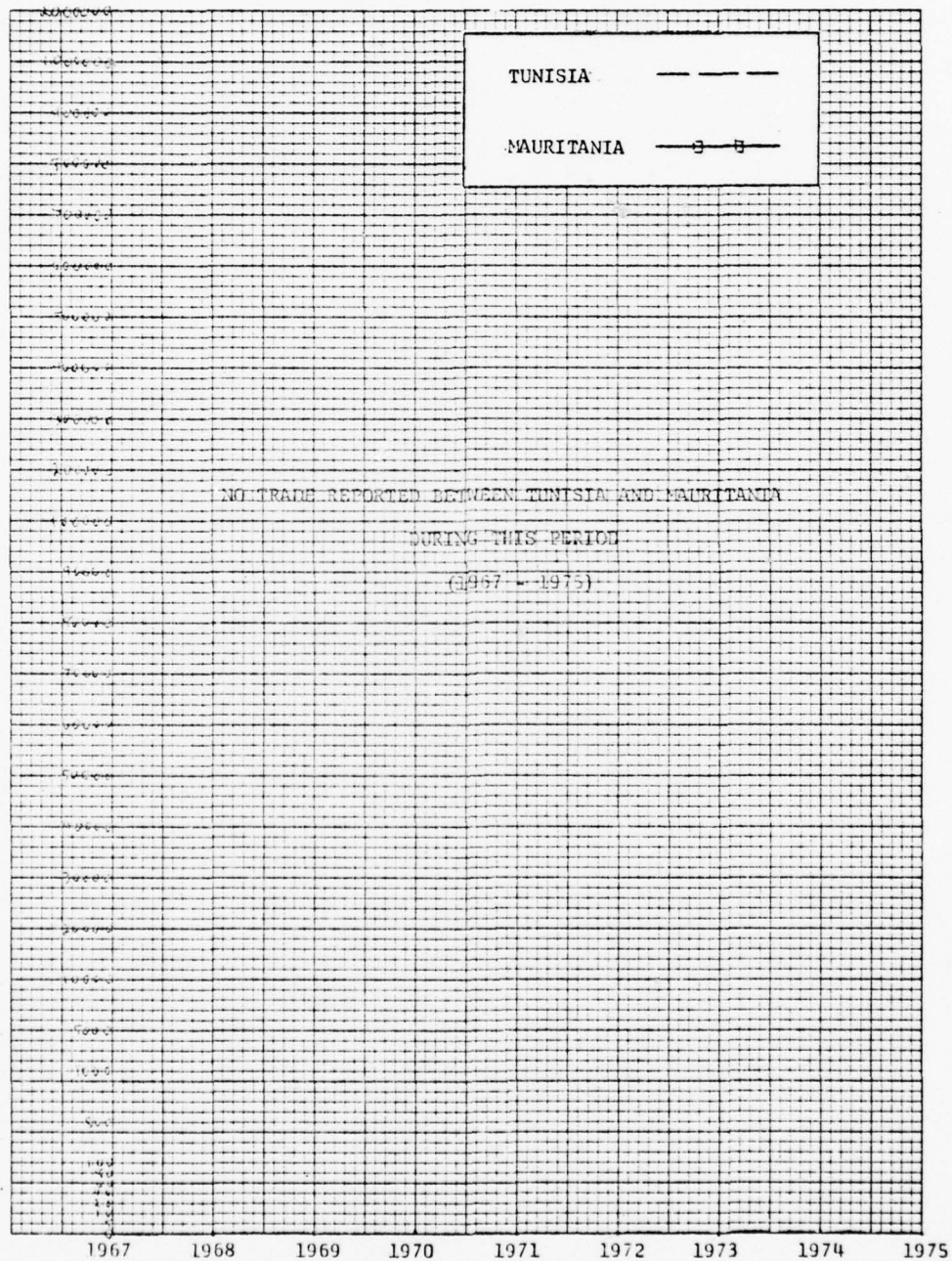
APPENDIX -- FIGURE 11
ALGERIA EXPORTS TO ITALY/ITALY EXPORTS TO ALGERIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



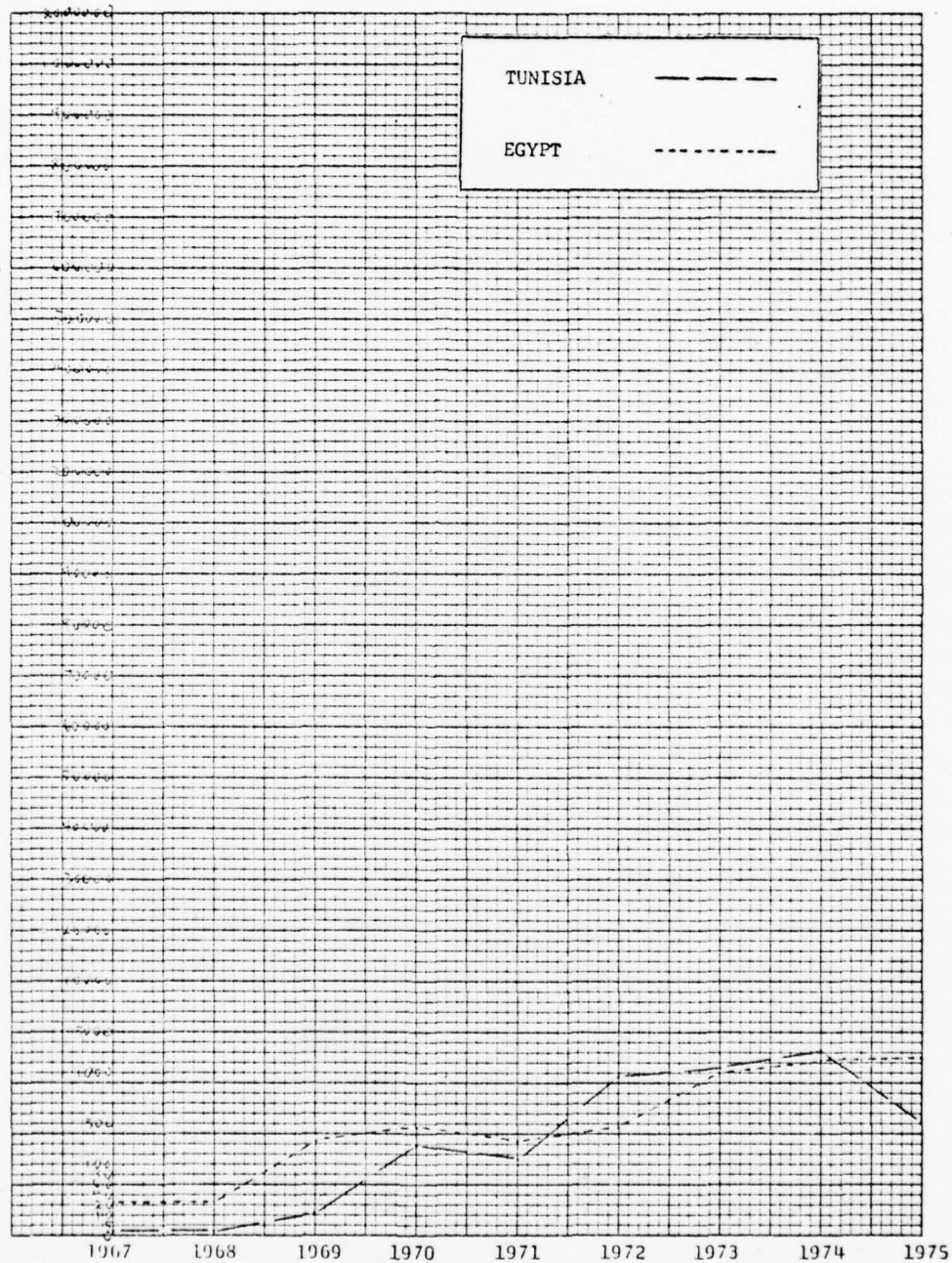
APPENDIX -- FIGURE 12
TUNISIA EXPORTS TO LIBYA/LIBYA EXPORTS TO TUNISIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



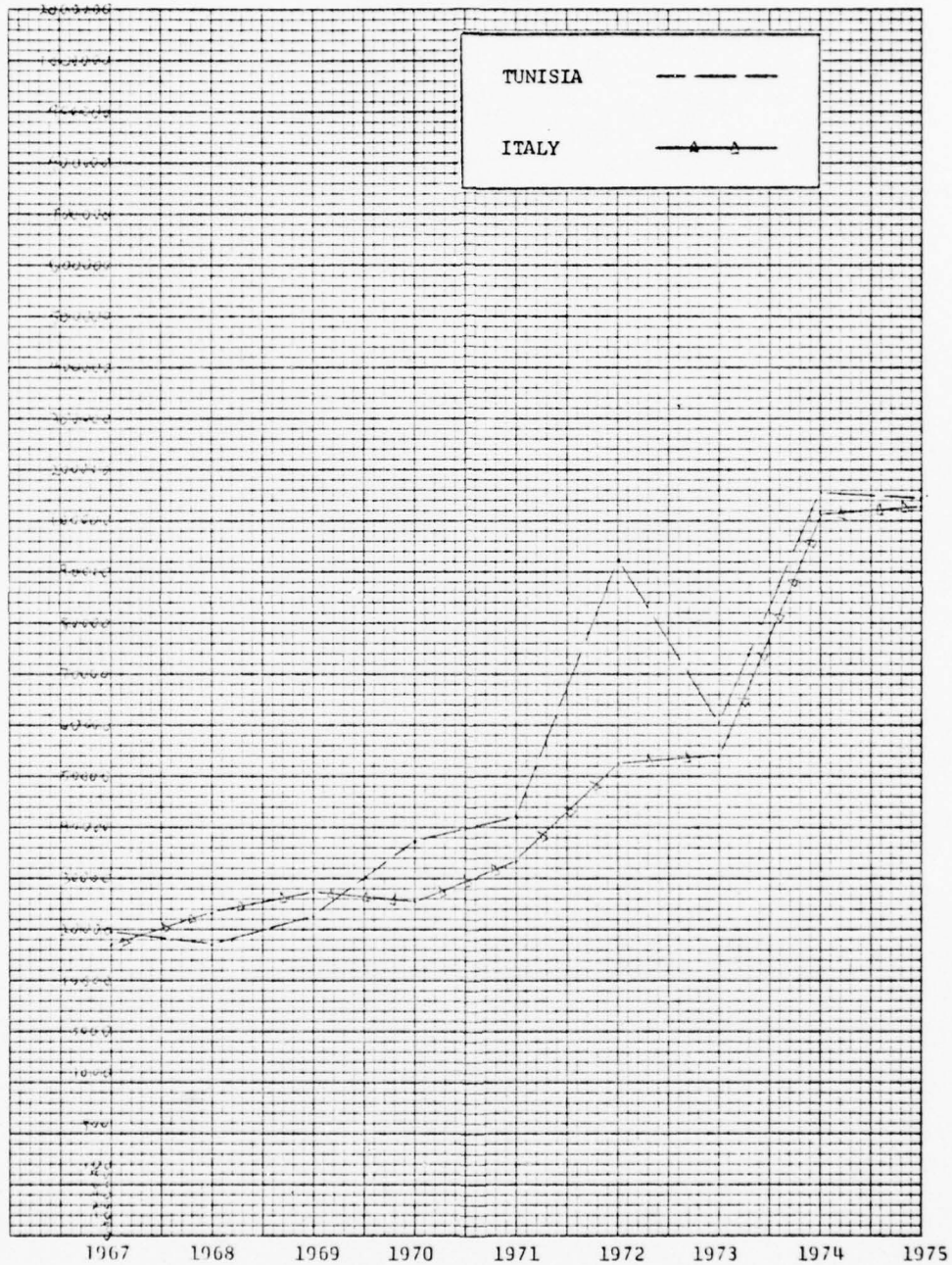
APPENDIX -- FIGURE 13
TUNISIA EXPORTS TO MAURITANIA/MAURITANIA EXPORTS TO TUNISIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



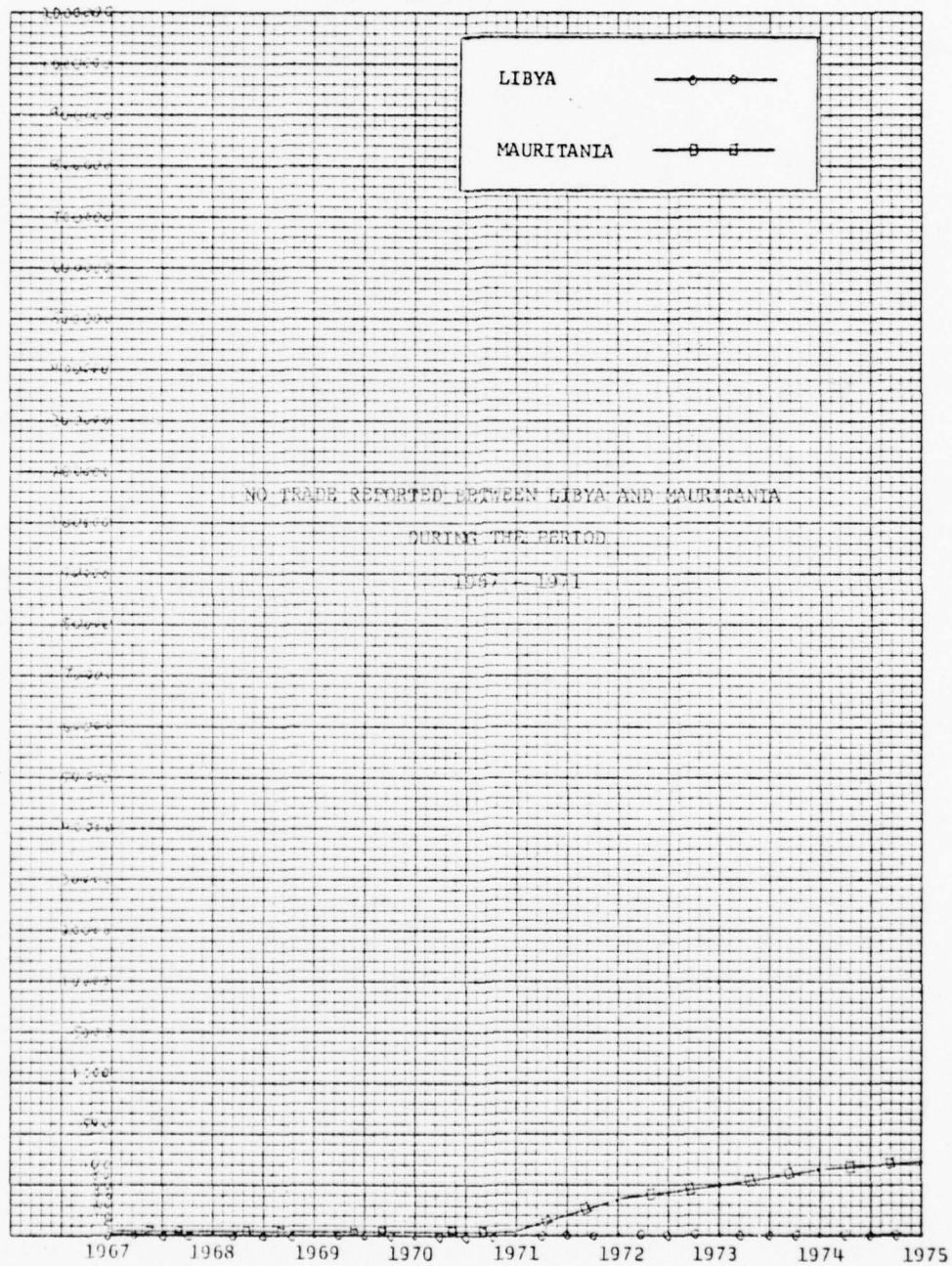
APPENDIX -- FIGURE 11
TUNISIA EXPORTS TO EGYPT/EGYPT EXPORTS TO TUNISIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



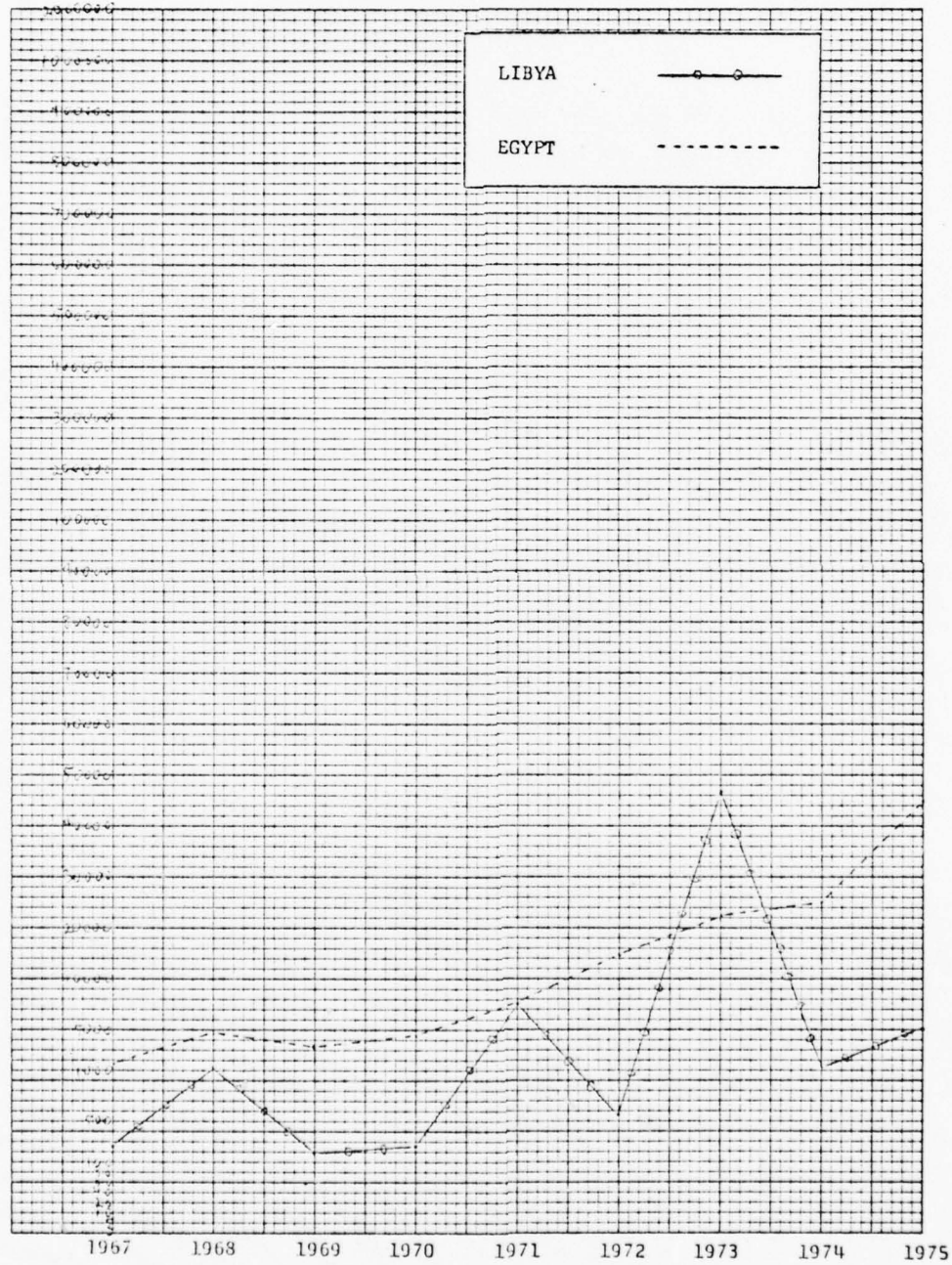
APPENDIX -- FIGURE 15
TUNISIA EXPORTS TO ITALY/ITALY EXPORTS TO TUNISIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



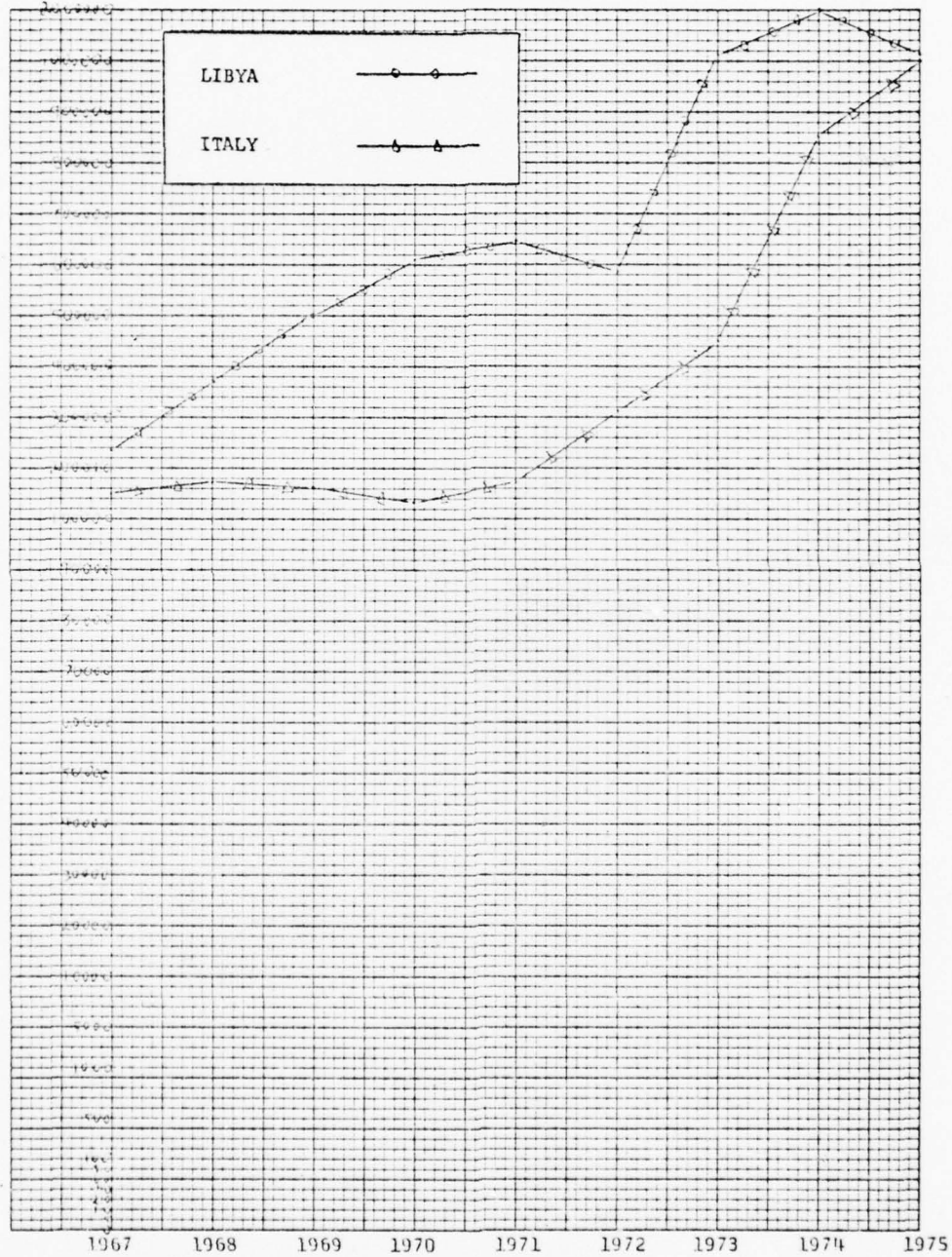
APPENDIX -- FIGURE 16
LIBYA EXPORTS TO MAURITANIA/MAURITANIA EXPORTS TO LIBYA
1000 U.S. DOLLARS
BY YEAR 1967-1975



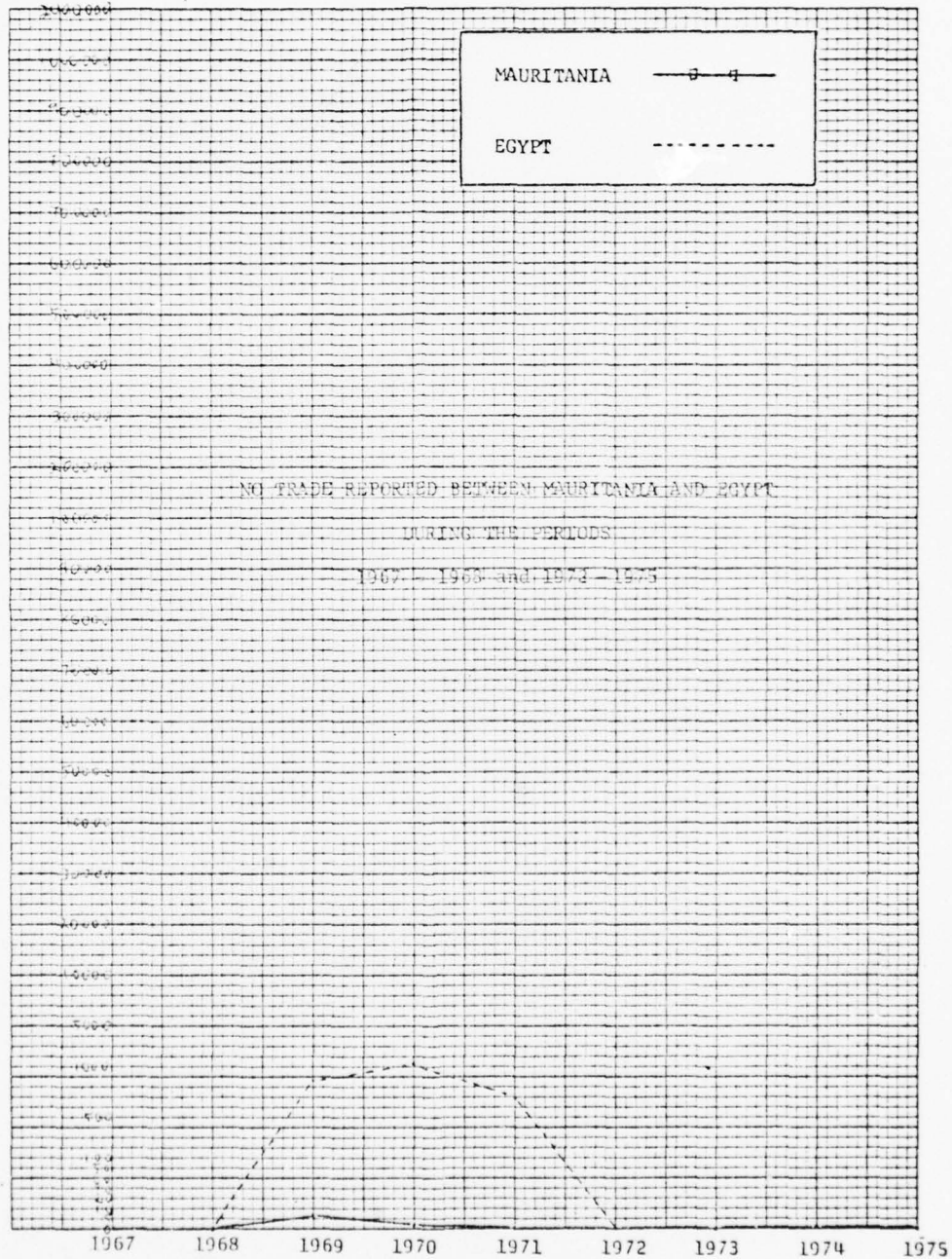
APPENDIX -- FIGURE 17
LIBYA EXPORTS TO EGYPT/EGYPT EXPORTS TO LIBYA
1000 U.S. DOLLARS
BY YEAR 1967-1975



APPENDIX -- FIGURE 18
LIBYA EXPORTS TO ITALY/ITALY EXPORTS TO LIBYA
1000 U.S. DOLLARS
BY YEAR 1967-1975



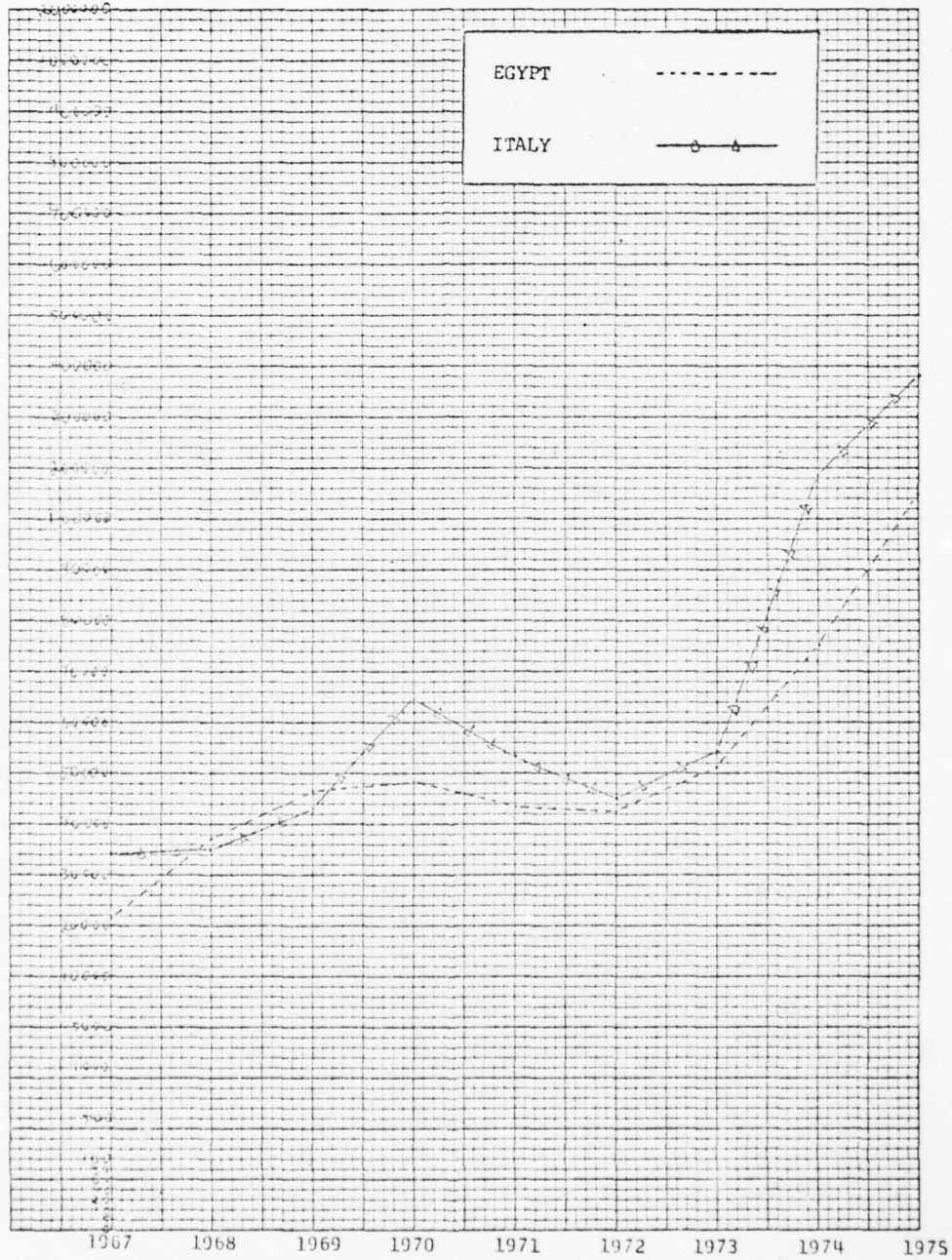
APPENDIX -- FIGURE 19
MAURITANIA EXPORTS TO EGYPT/EGYPT EXPORTS TO MAURITANIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



APPENDIX -- FIGURE 20
MAURITANIA EXPORTS TO ITALY/ITALY EXPORTS TO MAURITANIA
1000 U.S. DOLLARS
BY YEAR 1967-1975



APPENDIX -- FIGURE 21
EGYPT EXPORTS TO ITALY/ITALY EXPORTS TO EGYPT
1000 U.S. DOLLARS
BY YEAR 1967-1975



FOOTNOTES

¹ Clement Henry Moore, Politics in North Africa (Boston: Little, Brown and Company, 1970), p. 1.

² For examples of authorities who favor a three-state grouping consisting of Algeria, Morocco and Tunisia, see the following: John H. Sigler, "News Flow in the North African International Subsystem," International Studies Quarterly 13, 4 (December 1969): 386; Charles F. Gallagher, The United States and North Africa (Cambridge: Harvard University Press, 1967), pp. 1-2; Charles F. Gallagher, The Maghrib and the Middle East (Rand Corporation Research Study #RM-5962-ff, October 1969), p. v; Clement Henry Moore, Politics in North Africa (Boston: Little, Brown and Company, 1970), pp. vii-xvi; I. William Zartman, The Politics of Trade Negotiations Between Africa and the European Economic Community (Princeton: Princeton University Press, 1971), pp. 116-148; Samin Amin, The Maghreb in the Modern World, trans. Michael Perl (Harmondsworth, Middlesex, England: Penguin Books, Ltd., 1970), p. 7; and Bruce M. Russett, International Regions and the International System (Chicago: Rand McNally and Co., 1967), pp. 182-183.

³ For examples of authorities who favor a four-state grouping consisting of Algeria, Morocco, Tunisia and Libya, see the following: Jamil M. Abun-Nasr, A History of the Maghrib, 2d ed. (Cambridge: Cambridge University Press, 1975), p. 1; Edward A. Kolodziej, French International Policy under DeGaulle and Pompidou (Ithaca: Cornell University Press, 1974), p. 520; Boutros Boutros-Ghali, "The League of Arab States and North Africa," in Africa and International Organization, ed. by Yassin El-Ayouty and Hugh C. Brooks (The Hague: Martinus Nijhoff, 1974), pp. 107-181; Personal correspondence with the Tunisian Embassy, Washington, D.C., March 3, 1977; Benjamin Rivlin, "Problems and Prospects for North African Unity," in State and Society in Independent North Africa, ed. by Leon Carl Brown (Washington, D.C.: The Middle East Institute, 1966), pp. 286-302; and E. Kanovsky, "Arab Economic Unity," in International Regionalism, ed. by Joseph S. Nye, Jr., (Boston: Little, Brown and Company, 1968), pp. 350-376.

⁴ For examples of this model, see: Michael Brecher, "The Middle East Subordinate System and Its Impact on Israel's Foreign Policy," International Studies Quarterly 13, 2 (June 1969): 118; and Michael Brecher, The Foreign Policy System of Israel (New Haven: Yale University Press, 1972), pp. 48-49.

⁵ William R. Thompson, "The Regional Subsystem: A Conceptual Explication and a Propositional Inventory," International Studies Quarterly 17, 1 (March 1973): 91-96.

⁶ Louis J. Cantori and Steven L. Spiegel, The International Politics of Regions (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p. 9.

⁷ Oran R. Young, "The Perils of Odysseus: On Constructing Theories of International Relations," in Theory & Policy in International Relations, ed. by Raymond Tanter and Richard H. Ullman (Princeton: Princeton University Press, 1972), p. 179.

⁸ Ibid., p. 187.

⁹ J. David Singer, "The Level-of-Analysis Problem in International Relations," in International Politics and Foreign Policy, revised ed., ed. by James N. Rosenau (New York: The Free Press, 1969), pp. 20-21.

¹⁰ Charles A. Lave and James G. March, An Introduction to Models in the Social Sciences (New York: Harper & Row, 1975), p. 3.

¹¹ Singer, pp. 21-22.

¹² Lave and March, p. 3.

¹³ Kay Boals, "The Concept 'Subordinate International System': A Critique," in Regional Politics and World Order, ed. by Richard A. Falk and Saul H. Mendlovitz (San Francisco: W. H. Freeman and Co., 1973), p. 399.

14 James N. Rosenau, "The International System: Introductory Note," in International Politics and Foreign Policy, revised ed., ed. by James N. Rosenau (New York: The Free Press, 1969), p. 71.

15 Ibid.

16 Boals, p. 400.

17 The following list of works, while by no means comprehensive, will illustrate the wide range of "system" definitions in use: Kenneth E. Boulding, "General Systems Theory--The Skeleton of Science," in Modern Systems Research for the Behavioral Scientist, ed. by Walter Buckley (Chicago: Aldine, 1968), pp. 3-10; Carl J. Friedrich, Man and His Government: An Empirical Theory of Politics (New York: McGraw-Hill, 1963), p. 25; International Encyclopedia of the Social Sciences, 1968 ed., s.v. "International Systems," by Morton A. Kaplan; Morton A. Kaplan, System and Process in International Politics (New York: John Wiley & Sons, Inc., 1957), p. 4; Theory and the International System, cited by Louis J. Cantori and Steven L. Spiegel, The International Politics of Regions (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p. 3; Peter Nettl, "The Concept of System in Political Science," Political Studies 14 (October 1966): 307; James N. Rosenau, "The International System: Introductory Note," in International Politics and Foreign Policy, revised ed., ed. by James N. Rosenau (New York: The Free Press, 1969), p. 71; and William Zartman, "Africa as a Subordinate State System in International Relations," in Regional Politics and World Order, ed. by Richard A. Falk and Saul H. Mendlovitz (San Francisco: W. H. Freeman and Co., 1973), p. 385.

18 William Zartman, "Africa as a Subordinate State System in International Relations," in Regional Politics and World Order, ed. by Richard A. Falk and Saul H. Mendlovitz (San Francisco: W. H. Freeman and Co., 1973), p. 385.

19 For critiques of systems theory and definitions, see the following: Boals, pp. 399-410 and Kenneth E. Boulding, "General Systems Theory--The Skeleton of Science," in Modern Systems Research for the Behavioral Scientist, ed. by Walter Buckley (Chicago: Aldine, 1968), pp. 3-10.

- 20 Boals, p. 401.
- 21 Theory and the International System, cited by Louis J. Cantori and Steven L. Spiegel, The International Politics of Regions (Englewood Cliffs, N.J.: Prentice-Hall, 1970), p. 3.
- 22 Singer, p. 21.
- 23 Thompson, pp. 90-91.
- 24 Cantori and Spiegel, p. ix.
- 25 Ibid.
- 26 Thompson, p. 91.
- 27 Ibid.
- 28 Cantori and Spiegel, p. 5.
- 29 Ibid., p. 388.
- 30 For a listing of these considerations, see: Cantori and Spiegel, pp. 5-6.
- 31 Cantori and Spiegel, pp. 6-7.
- 32 Ibid., p. 9.
- 33 Ibid., p. 20.
- 34 Ibid., p. 9.
- 35 Ibid., p. 22.
- 36 Ibid., p. 9.
- 37 Ibid., p. 25.
- 38 Ibid., p. 9.

- 39 Ibid., p. 388.
- 40 Singer, p. 27.
- 41 On 14 November 1975, Spain reached a formal agreement over the status of her former colony of Spanish Sahara. By the terms of that agreement, Spain ceded the northern part of the Western Sahara to Morocco and the southern part to Mauritania. Africa Contemporary Record, 1975-76 ed., s.v. "Western Sahara," p. B161.
- 42 Cantori and Spiegel, pp. 6 and 49.
- 43 J. Barron Boyd, Jr., "The Structure of Foreign Policy Relationships Within the Southern African Subsystem" (Masters Thesis, University of South Carolina, 1974).
- 44 Cantori and Spiegel, p. 9.
- 45 Africa Research Bulletin, which is edited and published by Africa Research Ltd., Exeter, England, is a compendium of over 90 basic news sources relevant to our area of inquiry. The sources include newspapers, government reports, technical journals, wire services, popular magazines, radio monitoring reports and reports of multinational organizations.
- 46 For a complete listing of these sources, see the Notes to Table 18 of this study.
- 47 "Toward the Construction of an Empirically Grounded Typology of Foreign Policy Output Behavior," cited by J. Barron Boyd, Jr., "The Structure of Foreign Policy Relations Within the Southern African Subsystem" (Masters Thesis, University of South Carolina, 1974), p. 21.
- 48 Boyd, p. 21.
- 49 Ibid.
- 50 Ibid., p. 24.

51 Francis W. Hoole, "The Behavioral Science Orientation to the Study of International Administration," in Multinational Corporation ed. by Robert S. Jordan (New York: Oxford University Press, 1972), pp. 352-353.

52 Chadwick F. Alger, "Research on Research," International Organization XXIV, 3 (Summer 1970): 429.

53 Boyd, p. 40.

54 Steven J. Brams, "The Structure of Influence Relationships in the International System," in International Politics and Foreign Policy, revised ed., ed. by James N. Rosenau (New York: The Free Press, 1969), p. 596.

55 Boyd, p. 17.

56 Ibid., p. 18.

57 Michael Brecher, Decisions in Israel's Foreign Policy (London: Oxford University Press, 1974), p. 1.

58 The following historical example may illustrate the problem faced by scholars who are interested in the timely identification of foreign policy intent. Between 1957 and 1963, President Bourguiba of Tunisia engaged in an intense foreign policy campaign which played upon the "Greater Maghreb" theme. The content of Bourguiba's public speeches as well as other articles and statements reported in the press or made available to the public during this period seemed to indicate that Bourguiba's immediate goal was Tunisian/Libyan unification. It also seemed clear from these same public sources that Tunisian/Libyan unification was only Bourguiba's intermediate aim and that his ultimate goal was unification of the Greater Maghreb. Some expert observers of the North African political scene may have suspected at the time that this was not Bourguiba's real intent, but there was scant evidence, if any, to support their suspicions. With the passage of time and the evolution of political events, it has become clear (well after the fact) that Bourguiba's real intent had much to do with the strained relations which existed between Tunisia and Egypt under the government of President Nasser, and very little to do with a real desire for Tunisian/Libyan unification, much less

the formation of a Greater Maghreb. In this case, the passage of time has made evident the true intent of a leader's words and actions. In other instances, however, especially those involving so called "closed societies," we may never know the actual intent of leaders and their policies. For a discussion of the Bourguiba Greater Maghreb campaign and the changing perspective concerning its intent, see: Wilfred Knapp, North West Africa: A Political and Economic Survey, 3rd ed. (Oxford: Oxford University Press, 1977), p. 11.

59 Alexander L. George and Juliette L. George, Woodrow Wilson and Colonel House (New York: Dover Publications, Inc., 1956), p. xxii.

60 John F. Kennedy, quoted in Graham T. Allison, Essence of Decision (Boston: Little Brown and Co., 1971), p. vi.

61 For a complete listing of these sources, see the Notes to Table 18 of this study.

62 For a listing of the rules employed, see the Notes to Table 18 of this study.

63 For an explanation of the -9.1% factor, see: International Monetary Fund, Direction of Trade Annual 1970-76 (Washington, D.C.: Bureau of Statistics, IMF, 1977), p. ii.

64 Adapted by Boyd into his model from Herbert L. Calhoun, "Exploratory Applications to Scaled Event Data," A paper presented at the International Studies Association Convention, Dallas, Texas, March 14-16, 1972.

65 For our graph analysis, we used, as did Boyd, Frank Harary and Robert Z. Norman, Graph Theory as a Mathematical Model in Social Science (Ann Arbor: University of Michigan Press, 1953). In addition, we also referred to the following: Frank Harary, ed., A Seminar on Graph Theory (New York: Holt, Rinehart and Winston, 1967); Frank Harary and Edgar M. Palmer, Graphical Enumeration (New York: Academic Press, 1973).

66 Harary, A Seminar, pp. 3-4.

67 A complete graph is one in which all points are connected to all other points. See: Harary, A Seminar, p. 3.

68 Boyd, p. 36.

69 Ibid.

70 This formula, which Boyd first used on page 37 of his paper, was either developed by him or used in his model without reference to its original source. We have modified some of the symbols as used by Boyd for clarity.

71 Boyd, p. 40.

72 This formula, which first appears on page 41 of Boyd's paper, was adapted into the Boyd model from the following source: Herbert L. Calhoun, "Exploratory Applications to Scaled Event Data," (paper presented at the International Studies Association Convention, Dallas, Texas, March 14-16, 1972), p. 24a. Note that while the formula allows for the presence of neutral events, there are none in our data base.

73 This formula, which Boyd first used on page 43 of his paper, was either developed by him or used in his model without reference to its original source.

74 This formula, which Boyd first used on page 43 of his paper, was either developed by him or used in his model without reference to its original source.

75 This formula, which Boyd first used on pages 43-44 of his paper, was either developed by him or used in his model without reference to its original source.

76 Boyd, p. 47.

77 Cantori and Spiegel, p. 20. Note that the definition of "cohesion" used here by Cantori and Spiegel is more general than "Cohesion Index" which we defined earlier as "an indication of the level of solidarity within a group in terms of foreign policy interactions." "Cohesion," as defined by Cantori and Spiegel is essentially synonymous with William R. Thompson's regional subsystem attribute #2, which we selected as the analytical approach for this test.

78 Cantori and Spiegel, p. 22.

79 Ibid.

80 Ibid.

81 Ibid., p. 20.

82 For a complete listing of the sources from which data was taken, as well as other information concerning the nature of the data and rules which were used to compensate for incomplete and incorrect reporting, see Table 13--Continued (Trade Among the Countries of the Surveyed Group 1967-1975 Notes).

83 Note that all of the trade relationship computations and graphical analyses of this chapter are based entirely upon data drawn from these nine tables (Tables 10-18).

84 A rooted graph has one of its points, called the root, distinguished from all the others. See: Frank Harary and Edgar M. Palmer, Graphical Enumeration (New York: Academic Press, 1973), p. 6.

85 Note the important distinction here between intra-group trade (that is, trade among the members of our seven state survey group) and world trade. While Italy was the primary intra-group export and import trading partner during the period 1967-1975, were we to extend our outlook to all countries of the world market, we would find that France has long been the primary export and import trading partner of the Maghreb countries with the exception of Libya, where Italy has generally held the dominant trade position. See: Roger Le Tourneau et al., L'Unité Maghrébine: Dimensions et Perspectives (Paris: Editions du Centre National de la Recherche Scientifique, 1972), p. 63.

86 Note that in a group of seven states, for a survey period of nine years, the maximum number of country-years any given state could achieve is 54, since no country can be its own import supplier nor export recipient.

87 Wilfred Knapp, North West Africa: A Political and Economic Survey, 3rd ed. (Oxford: Oxford University Press, 1977), pp. 12-13.

88 Abderrahman Robana, The Prospects for an Economic Community in North Africa: Managing Economic Intergration in the Maghreb States (New York: Praeger Publishers, 1973), p. 93.

89 Cantori and Spiegel, p. 22.

90 Harary, A Seminar, pp. 3-4.

91 Ibid., p. 3.

92 Note that the export and import plots for both Italy and Egypt in this particular analysis are not very meaningful. Italy's plots represent her trade with five states of the postulated region as a percentage of her trade with Egypt and, in like manner, Egypt's plots represent her trade with the same five states as a percentage of her trade with Italy.

93 I. William Zartman, "Forward," in The Prospects for an Economic Community in North Africa, by Abderrahman Robana (New York: Praeger Publishers, 1973), p. v.

94 Cantori and Spiegel, p. 25.

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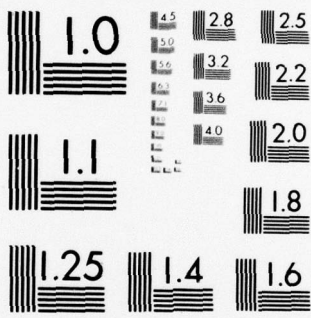
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